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# ALASKA POPULATION OVERVIEW
# 1982

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## PREFACE

*Alaska Population Overview* is designed to provide frequently requested population information in one publication. In order to provide a consistent set of data, *this publication presents the resident population of Alaska under exactly the same concepts and definitions used by the U.S. Bureau of the Census for the 1980 Decennial Census of Alaska.*

This edition of *Alaska Population Overview* is comprised of four sections. The first section provides the 1982 population of the state's boroughs, census areas, and municipalities, the number of persons by age and sex for each borough and census area and information on the number of active duty military personnel in each borough and census area. Section II provides historical data. It displays the number of persons by age and sex for boroughs and census areas for each year, 1970 to 1982, the annual components of population change (births, deaths, and net number of migrants) for the boroughs and census areas, 1970 to 1982, and the number of active duty military for each year, 1970 to 1982. The third section contains data and instructions that can be used by virtually anyone needing a long range population forecast for Alaska. This approach to filling the demand for long range population forecasts will allow someone to turn his or her own assumptions about the future economic and social conditions affecting Alaska into the expected population associated with those conditions. The final section contains special reports on the demography of Alaska, technical documentation, and research findings.

Any comments or suggestions regarding the contents or format of this publication are welcomed. Questions related to: 1980 census data should be addressed to Barbara Baker (465-4513); federal intercensal population estimates and special census activities to Jo Van Patten (465-2771); or current state estimates, projections, and methods to David Swanson (465-2771).

Special acknowledgment is given to the Department of Health and Social Services, the Department of Education, and each of the city and borough officials and staff members who provided data and worked cooperatively in developing the 1982 population determinations. Information on military personnel was provided by Personnel Departments for the service branches represented in Alaska.

# I. 1982 POPULATION DATA

# I. 1982 POPULATION DATA

## Introduction

This section of the 1982 edition of *Alaska Population Overview* contains 1980 and 1982 resident population determinations for the state, its boroughs and census areas, and municipalities. Estimates of the number of persons by age and sex for boroughs and census areas in 1982 are also found in this section along with estimates of civilian and military populations. The methods used to develop the 1982 data are described in a report found in Section IV. The definition of resident population for 1982 is the same as the one used by the U.S. Bureau of the Census for the 1980 Decennial Census in Alaska. The data for 1980 represent the official figures of the U. S. Bureau of the Census. These figures vary from the revised 1980 estimates found in Section II.

TABLE I.1

Population of Boroughs
and Census Areas, Alaska
1980 and 1982

| Census Area | April 1, 1980 Population | July 1, 1982 Population |
|---|---|---|
| STATE OF ALASKA | 401,851 | 460,837 |
| Aleutian Islands | 7,768 | 8,525 |
| Anchorage, Municipality of | 174,431 | 200,503 |
| Bethel | 10,999 | 11,323 |
| Bristol Bay Borough | 1,094 | 1,271 |
| Dillingham | 4,616 | 4,697 |
| Fairbanks-North Star Borough | 53,983 | 59,222 |
| Haines Borough | 1,680 | 1,854 |
| Juneau, City and Borough of | 19,528 | 22,030 |
| Kenai Peninsula Borough | 25,282 | 32,486 |
| Ketchikan Gateway Borough | 11,316 | 12,432 |
| Kobuk | 4,831 | 5,090 |
| Kodiak Island Borough | 9,939 | 12,714 |
| Matanuska-Susitna Borough | 17,816 | 25,212 |
| Nome | 6,537 | 7,459 |
| North Slope Borough | 4,199 | 4,849 |
| Prince of Wales Island-Outer Ketchikan | 3,822 | 4,386 |
| Sitka, City and Borough of | 7,803 | 8,223 |
| Skagway-Yakutat-Angoon | 3,478 | 3,578 |
| Southeast Fairbanks | 5,676 | 6,056 |
| Valdez-Cordova | 8,348 | 9,455 |
| Wade Hampton | 4,665 | 4,832 |
| Wrangell-Petersburg | 6,167 | 6,698 |
| Yukon-Koyukuk | 7,873 | 7,942 |

Table I.2

Population of Boroughs, Census Areas,
and Incorporated Places, Alaska: 1980 and 1982

| | April 1, 1980 Population | July 1, 1982 Population*** |
|---|---|---|
| STATE OF ALASKA | 401,851 | 460,837 |
| Aleutian Islands Census Area | 7,768 | 8,525 |
| Akutan | 169 | 188 |
| Cold Bay 1/ | 228 | 250 |
| King Cove | 460 | 523* |
| Saint Paul | 551 | 595* |
| Sand Point | 625 | 797* |
| Unalaska | 1,322 | 1,922 |
| Anchorage, Municipality of | 174,431 | 200,503 |
| Bethel Census Area | 10,999 | 11,323 |
| Akiachak | 438 | 451 |
| Akiak | 198 | 229* |
| Akolmiut 2/ | 641 2/ | 353*2/ |
| Aniak | 341 | 351 |
| Atmautluak | 219 | 236 |
| Bethel | 3,576 | 3,683 |
| Chefornak | 230 | 244* |
| Chuathbaluk | 105 | 124* |
| Eek | 228 | 235 |
| Goodnews Bay | 168 | 173 |
| Kasigluk 2/ | N/A 2/ | 328*2/ |
| Kwethluk | 454 | 467 |
| Mekoryuk | 160 | 178* |
| Napakiak | 262 | 286* |
| Napaskiak | 244 | 251 |
| Newtok | 131 | 175* |
| Nightmute | 119 | 141 |
| Platinum | 55 | 57 |
| Quinhagak | 412 | 427* |
| Toksook Bay | 333 | 357* |
| Tuluksak | 236 | 243 |
| Tununak | 298 | 302* |
| Lower Kalskag | 246 | 260* |
| Upper Kalskag | 129 | 133 |

Table I.2

Population of Boroughs, Census Areas,
and Incorporated Places, Alaska: 1980 and 1982
(continued)

| | April 1, 1980 Population | July 1, 1982 Population*** |
|---|---|---|
| Bristol Bay Borough | 1,094 | 1,271 |
| Dillingham Census Area | 4,616 | 4,697 |
| Aleknagik | 154 | 232* |
| Clark's Point | 79 | 80 |
| Dillingham | 1,563 | 1,791 |
| Ekwok | 77 | 78 |
| Manokotak | 294 | 299 |
| Newhalen | 87 | 140 |
| New Stuyahok | 331 | 337 |
| Nondalton | 173 | 176 |
| Port Heiden | 92 | 94 |
| Togiak | 470 | 507* |
| Fairbanks-North Star Borough[3/] | 53,983 [3/] | 59,222 [3/] |
| Fairbanks | 22,645 | 25,967 |
| North Pole | 724 | 942 |
| Haines Borough | 1,680 | 1,854 |
| Haines | 993 | 1,078* |
| Juneau, City and Borough of | 19,528 | 22,030 |

Table I.2

Population of Boroughs, Census Areas,
and Incorporated Places, Alaska: 1980 and 1982
(continued)

| | April 1, 1980 Population | July 1, 1982 Population*** |
|---|---|---|
| Kenai Peninsula Borough | 25,282 | 32,486** |
| Homer | 2,209 | 2,900** |
| Kachemak 4/ | 403 4/ | 288**4/ |
| Kenai | 4,324 | 5,261** |
| Seldovia | 479 | 733** |
| Seward | 1,843 | 1,839** |
| Soldotna | 2,320 | 3,025** |
| Ketchikan Gateway Borough | 11,316 | 12,432 |
| Ketchikan | 7,198 | 7,778 |
| Saxman | 273 | 303 |
| Kobuk Census Area | 4,831 | 5,090 |
| Ambler | 192 | 202 |
| Buckland | 177 | 217* |
| Deering | 150 | 158 |
| Kiana | 345 | 364 |
| Kivalina | 241 | 253 |
| Kobuk | 62 | 64* |
| Kotzebue | 2,054 | 2,470** |
| Noorvik | 492 | 518 |
| Selawik | 535 5/ | 602* |
| Shungnak | 202 | 214* |
| Kodiak Island Borough 6/ | 9,939 6/ | 12,714**6/ |
| Akhiok | 105 | 103** |
| Kodiak | 4,756 | 5,873** |
| Larsen Bay | 168 | 180** |
| Old Harbor | 340 | 355** |
| Ouzinkie | 173 | 233** |
| Port Lions | 215 | 291** |

Table I.2

Population of Boroughs, Census Areas, and Incorporated Places, Alaska: 1980 and 1982 (continued)

| | April 1, 1980 Population | July 1, 1982 Population*** |
|---|---|---|
| Matanuska-Susitna Borough | 17,816 | 25,212 |
| Houston | 370 | 826 |
| Palmer | 2,141 | 2,542** |
| Wasilla | 1,559 | 2,403** |
| Nome Census Area | 6,537 | 7,459 |
| Brevig Mission | 138 | 134 |
| Diomede | 139 | 134 |
| Elim | 211 | 205 |
| Gambell | 445 | 432 |
| Golovin | 87 | 112* |
| Koyuk | 188 | 183 |
| Nome 7/ | 2,301 7/ | 3,430 7/ |
| St. Michael | 239 | 295* |
| Savoonga | 491 | 477 |
| Shaktoolik | 164 | 159 |
| Shishmaref | 394 | 425* |
| Stebbins | 331 | 321 |
| Teller | 212 | 206 |
| Unalakleet | 623 | 604 |
| Wales | 133 | 129 |
| White Mountain | 125 | 121 |
| North Slope Borough | 4,199 8/ | 4,849 8/ |
| Anaktuvak Pass | 203 | 250 |
| Barrow | 2,267 9/ | 2,882* |
| Kaktovik | 165 | 214 |
| Nuiqsut | 208 | 287 |
| Point Hope | 464 | 544* |
| Wainwright | 405 | 436 |

Table I.2

Population of Boroughs, Census Areas, and Incorporated Places, Alaska: 1980 and 1982 (continued)

| | April 1, 1980 Population | July 1, 1982 Population*** |
|---|---|---|
| Prince of Wales-Outer Ketchikan Census Area | 3,822 | 4,386 |
| Craig | 527 | 604 |
| Hydaburg | 298 | 412* |
| Kasaan | 25 | 70* |
| Klawock | 318 | 433* |
| Thorne Bay 10/ | 320 10/ | 316*10/ |
| Sitka, City and Borough of | 7,803 | 8,223 |
| Skagway-Yakutat-Angoon Census Area | 3,478 | 3,578 |
| Angoon | 465 | 562* |
| Hoonah | 680 | 864 |
| Pelican | 180 | 185 |
| Skagway | 768 | 790 |
| Tenakee Springs | 138 | 141* |
| Yakutat | 449 | 462 |
| Southeast Fairbanks Census Area | 5,676 | 6,056 |
| Delta Junction | 945 | 1,047 |
| Eagle | 110 | 142* |
| Valdez-Cordova Census Area | 8,348 | 9,455 |
| Cordova | 1,879 | 2,244 |
| Valdez | 3,079 | 3,698** |
| Whittier | 198 | 224 |
| Wade Hampton Census Area | 4,665 | 4,832 |
| Alakanuk | 522 | 546 |
| Chevak | 466 | 513* |
| Emmonak | 561 | 581 |
| Fortuna Ledge | 262 | 260* |
| Hooper Bay | 627 | 651 |
| Kotlik | 293 | 347 |
| Mountain Village | 583 | 601* |
| Pilot Station | 325 | 337 |
| Russian Mission | 169 | 175 |
| St. Mary's | 382 | 442 |
| Scammon Bay | 250 | 251* |
| Sheldon Point | 103 | 107 |

Table I.2

Population of Boroughs, Census Areas, and Incorporated Places, Alaska: 1980 and 1982 (continued)

| | April 1, 1980 Population | July 1, 1982 Population*** |
|---|---|---|
| Wrangell-Petersburg Census Area | 6,167 | 6,698 |
| Kake | 555 | 631 |
| Kupreanof | 47 | 54* |
| Petersburg | 2,821 | 3,040 |
| Port Alexander | 86 | 98 |
| Wrangell | 2,184 | 2,376 |
| Yukon-Koyukuk Census Area | 7,873 | 7,942 |
| Allakaket | 163 | 169* |
| Anderson | 517 | 522 |
| Anvik | 114 | 115 |
| Fort Yukon | 619 | 625 |
| Galena | 765 | 847 |
| Grayling | 209 | 211 |
| Holy Cross | 241 | 243 |
| Hughes | 73 | 74 |
| Huslia | 188 | 241 |
| Kaltag | 247 | 246* |
| Koyukuk | 98 | 99 |
| McGrath | 355 | 498* |
| Nenana | 470 | 475 |
| Nikolai | 91 | 110* |
| Nulato | 350 | 353 |
| Ruby | 197 | 214* |
| Shageluk | 131 | 132 |
| Tanana | 388 | 486 |

## FOOTNOTES

1/ Cold Bay was not incorporated until 1982. The 1980 figure represents Cold Bay as a "Census Designated Place."

2/ In 1980 the city of Kasigluk did not exist; it comprised part of the city of Akolmiut. Kasigluk became a city in 1982, which reduced the population of Akolmiut.

3/ The Eielson Air Force Reservation has never been annexed to the Fairbanks-North Star Borough. Consequently its estimated population for 1982 of 5,320 is subtracted from the Borough total of 59,222 in order to obtain the Borough's population for its legal boundaries, which is 53,902. The equivalent population for 1980 is 48,663.

4/ In 1980, it appears that the U.S. Bureau of the Census incorrectly defined the boundary of the city of Kachemak and counted people who were actually outside of Kachemak as part of Kachemak's population.

5/ 535 is a corrected 1980 census figure for Selawik. The original, incorrect number released by the U.S. Bureau of the Census was 361.

6/ Subsequent to the 1980 census, the Kodiak Island Borough annexed the Kodiak Island Coast Guard Station. Both the 1980 and 1982 figures reflect the presence of the Coast Guard station population in the total borough population.

7/ In 1982, Nome annexed the unincorporated "place" of Icy View, which had 210 residents. Further in 1980, the U.S. Census Bureau used boundaries for Nome that were later expanded legally. The 1982 figure for Nome reflects both the annexation of Icy View and the expanded boundaries.

8/ The 1982 estimate is based upon the rule used during the 1980 federal census, which did not treat the oil-related worksites as places in which workers resided regardless of length of time spent. Additional discussion of this issue is contained on page 7, 1981 *Alaska Population Overview*.

9/ 2,267 is a corrected 1980 census figure for the city of Barrow. The original, incorrect number of 2,207 released by the U.S. Bureau of the Census reflected a mis-allocation of 60 persons into an area outside of the city of Barrow.

10/ Thorne Bay was not an incorporated city in 1980, it was a "Census Designated Place" with a population of 320, which is the figure shown for 1980. Thorne Bay incorporated in 1982.

* Indicates a census conducted in accordance with procedures contained in *Standards for Conducting a Census in Small Alaskan Cities.*

** Indicates a census conducted in accordance with procedures contained in *Alaska Census Administrator's Manual* and *Alaska Census Enumerator's Manual.*

*** The 1982 determinations were made under the same definition of population used by the U.S. Bureau of the Census during the 1980 census.

TABLE I.3

ALASKA BOROUGHS AND CITIES RANKED BY 1982 POPULATION

| | July 1 Population | | July 1 Population |
|---|---|---|---|
| Anchorage Municipality | 200,503 | Emmonak | 581 |
| Fairbanks North Star Borough | 59,222 | Angoon | 562 |
| Kenai Peninsula Borough | 32,486 | Alakanuk | 546 |
| Fairbanks City | 25,967 | Point Hope | 544 |
| Matanuska-Susitna Borough | 25,212 | King Cove | 523 |
| Juneau City and Borough | 22,030 | Anderson | 522 |
| Kodiak Island Borough | 12,714 | Noorvik | 518 |
| Ketchikan Borough | 12,432 | Chevak | 513 |
| Sitka City and Borough | 8,223 | Togiak | 507 |
| Ketchikan City | 7.778 | McGrath | 498 |
| Kodiak City | 5,873 | Tanana | 487 |
| Kenai City | 5,261 | Nenana | 477 |
| North Slope Borough | 4,849 | Savoonga | 475 |
| Valdez | 3,698 | Kwethluk | 467 |
| Bethel | 3,683 | Yakutat | 462 |
| Nome | 3,430 | Akiachak | 451 |
| Petersburg | 3,040 | St. Mary's | 442 |
| Soldotna | 3,025 | Wainwright | 436 |
| Homer | 2,900 | Klawock | 433 |
| Barrow | 2,882 | Gambell | 432 |
| Palmer | 2,542 | Quinhagak | 427 |
| Kotzebue | 2,470 | Shishmaref | 425 |
| Wasilla | 2,403 | Hydaburg | 412 |
| Wrangell | 2,376 | Kiana | 364 |
| Cordova | 2,244 | Toksook Bay | 357 |
| Unalaska | 1,922 | Old Harbor | 355 |
| Haines Borough | 1,854 | Akolmiut | 353 |
| Seward | 1,839 | Nulato | 353 |
| Dillingham | 1,791 | Aniak | 351 |
| Bristol Bay Borough | 1,271 | Kotlik | 347 |
| Metlakatla | 1,212 | New Stuyahok | 337 |
| Haines City | 1,078 | Pilot Point | 337 |
| Delta Junction | 1,047 | Kasigluk | 328 |
| North Pole | 942 | Stebbins | 321 |
| Hoonah | 864 | Thorne Bay | 316 |
| Galena | 847 | Saxman | 303 |
| Houston | 826 | Tununak | 302 |
| Sand Point | 797 | Manotak | 299 |
| Skagway | 790 | St. Michael | 295 |
| Seldovia | 733 | Port Lions | 291 |
| Hooper Bay | 651 | Kachemak | 288 |
| Kake | 631 | Nuiqsut | 287 |
| Fort Yukon | 625 | Napakiak | 286 |
| Craig | 604 | Fortuna Ledge | 260 |
| Unalakleet | 604 | Lower Kalskag | 260 |
| Selawik | 602 | Kivalina | 253 |
| Mountain Village | 601 | Napaskiak | 251 |
| St. Paul | 595 | Scammon Bay | 251 |

TABLE I.3 (continued)

| | July 1 Population | | July 1 Population |
|---|---|---|---|
| Anaktuvuk Pass | 250 | Allakaket | 169 |
| Cold Bay | 250 | Shaktoolik | 159 |
| Kaltag | 246 | Deering | 158 |
| Chefornak | 244 | Eagle | 142 |
| Holy Cross | 243 | Nightmute | 141 |
| Tuluksak | 243 | Tanakee Springs | 141 |
| Huslia | 241 | Newhalen | 140 |
| Atmautluak | 236 | Brevig Mission | 134 |
| Eek | 235 | Diomede | 134 |
| Ouzinkie | 233 | Upper Kalskag | 133 |
| Aleknagik | 232 | Shageluk | 132 |
| Akiak | 229 | Wales | 129 |
| Whittier | 224 | Chuathbaluk | 124 |
| Buckland | 217 | White Mountain | 121 |
| Kaktovik | 214 | Anvik | 115 |
| Ruby | 214 | Golovin | 112 |
| Shungnak | 214 | Nikolai | 110 |
| Grayling | 211 | Sheldon Point | 107 |
| Teller | 206 | Akiok | 103 |
| Elim | 205 | Koyukuk | 99 |
| Ambler | 202 | Port Alexander | 98 |
| Akutan | 188 | Port Heiden | 94 |
| Pelican | 185 | Clark's Point | 80 |
| Koyuk | 183 | Ekwok | 78 |
| Larsen Bay | 180 | Hughes | 74 |
| Mekoryuk | 178 | Kasaan | 70 |
| Nondalton | 176 | Kobuk | 64 |
| Newtok | 175 | Platinum | 57 |
| Russian Mission | 175 | Kupreanof | 54 |
| Goodnews Bay | 173 | | |

TABLE I.4

Persons by Age and Sex
Alaska, July 1, 1982*

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 10019 | 5060 | 4959 |
| 1-4 years | 34062 | 17620 | 16442 |
| 5-9 years | 36573 | 18742 | 17831 |
| 10-14 years | 38257 | 19688 | 18569 |
| 15-19 years | 41316 | 21737 | 19579 |
| 20-24 years | 52487 | 29175 | 23312 |
| 25-29 years | 53998 | 26919 | 27079 |
| 30-34 years | 48770 | 26329 | 22441 |
| 35-39 years | 39264 | 20992 | 18272 |
| 40-44 years | 27357 | 14430 | 12927 |
| 45-49 years | 21560 | 11486 | 10074 |
| 50-54 years | 17821 | 9705 | 8116 |
| 55-59 years | 14771 | 7726 | 7045 |
| 60-64 years | 10624 | 5451 | 5173 |
| 65-69 years | 6310 | 3113 | 3197 |
| 70-74 years | 3821 | 1818 | 2003 |
| 75 years and over | 3790 | 1652 | 2138 |
| Total | 460800 | 241643 | 219157 |

* The total population is a rounded figure.

TABLE I.5

Civilian Persons
By Age and Sex, Alaska
July 1, 1982

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 10019 | 5060 | 4959 |
| 1-4 years | 34062 | 17620 | 16442 |
| 5-9 | 36573 | 18742 | 17831 |
| 10-14 | 38257 | 19688 | 18569 |
| 15-19 | 39879 | 20382 | 19497 |
| 20-24 | 41872 | 19022 | 22850 |
| 25-29 | 50706 | 23887 | 26819 |
| 30-34 | 46360 | 24143 | 22217 |
| 35-39 | 36917 | 18837 | 18080 |
| 40-44 | 26284 | 13522 | 12762 |
| 45-49 | 21103 | 11068 | 10035 |
| 50-54 | 17493 | 9412 | 8081 |
| 55-59 | 14669 | 7637 | 7032 |
| 60-64 | 10582 | 5418 | 5164 |
| 65-69 | 6310 | 3113 | 3197 |
| 70-74 | 3821 | 1818 | 2003 |
| 75 & Over | 3790 | 1652 | 2138 |
| Total | 438697 | 221021 | 217676 |

TABLE I.6

Total, Civilian, and
Active Duty Military Populations
for Boroughs and Census Areas
Alaska, 1982

| 1980 Census Area | Total Population | Civilian Population | Active Duty Military |
|---|---|---|---|
| Aleutian Islands | 8525 | 6307 | 2218 |
| Anchorage | 200503 | 189548 | 10955 |
| Bethel | 11323 | 11280 | 43 |
| Bristol Bay Borough | 1271 | 927 | 344 |
| Dillingham | 4697 | 4697 | 0 |
| Fairbanks North Star | 59222 | 54089 | 5133 |
| Haines | 1854 | 1854 | 0 |
| Juneau | 22030 | 21738 | 292 |
| Kenai Peninsula | 32486 | 32418 | 60 |
| Ketchikan Gateway | 12432 | 12217 | 215 |
| Kobuk | 5090 | 5073 | 17 |
| Kodiak Island | 12714 | 11704 | 1010 |
| Matanuska-Susitna | 25212 | 25212 | 0 |
| Nome | 7459 | 7415 | 44 |
| North Slope | 4849 | 4829 | 20 |
| Outer Ketchikan-Prince of Wales | 4386 | 4386 | 0 |
| Sitka | 8223 | 8030 | 193 |
| Skagway-Yakutat-Angoon | 3578 | 3578 | 0 |
| Southeast Fairbanks | 6056 | 5276 | 780 |
| Valdez-Cordova | 9455 | 9368 | 87 |
| Wade Hampton | 4832 | 4817 | 15 |
| Wrangell-Petersburg | 6698 | 6676 | 22 |
| Yukon-Koyukuk | 7942 | 7295 | 647 |
| TOTAL | 460837 | 438734 | 22103 |

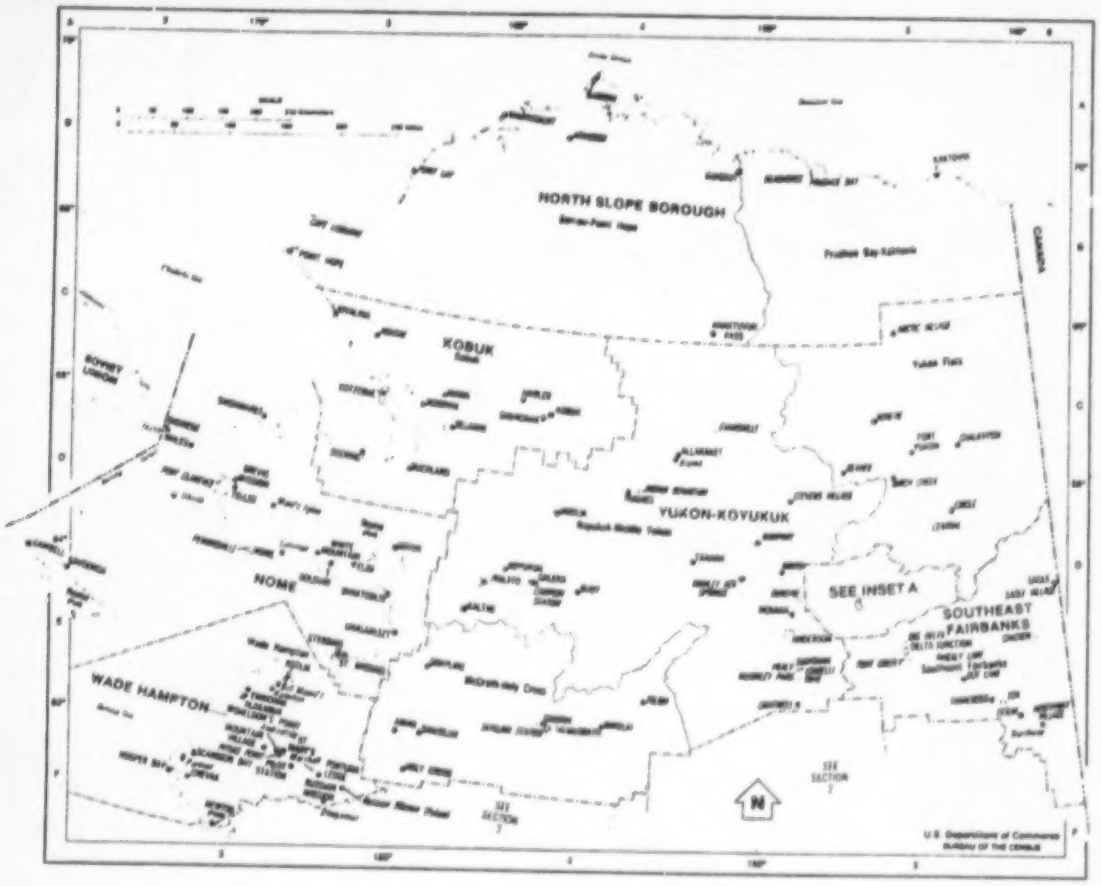
# Table I.7
## Persons by Sex and Selected Age Groups
## Boroughs and Census Areas, Alaska, 1982*

| | Number of Persons, July 1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | TOTAL | | Under 5 years | | 5 to 14 years | | 15 to 64 years | | 65 years & Over | |
| The STATE | Total 460,800 | Female 219,160 | Total 44,080 | Female 21,400 | Total 74,830 | Female 36,400 | Total 327,970 | Female 154,020 | Total 13,920 | Female 7,340 |
| Aleutian Islands | 8,500 | 3,410 | 700 | 340 | 1,050 | 500 | 6,620 | 2,500 | 130 | 70 |
| Anchorage | 200,500 | 97,110 | 18,470 | 9,020 | 31,320 | 15,130 | 146,330 | 70,440 | 4,380 | 2,520 |
| Bethel | 11,300 | 5,330 | 1,280 | 630 | 2,300 | 1,130 | 7,270 | 3,350 | 450 | 220 |
| Bristol Bay | 1,300 | 480 | 70 | 30 | 140 | 80 | 1,060 | 360 | 30 | 10 |
| Dillingham | 4,700 | 2,250 | 440 | 220 | 870 | 430 | 3,220 | 1,540 | 170 | 60 |
| Fairbanks-North Star | 59,200 | 27,850 | 5,950 | 2,960 | 9,150 | 4,410 | 42,510 | 19,690 | 1,590 | 790 |
| Haines | 1,900 | 880 | 160 | 80 | 300 | 120 | 1,350 | 630 | 90 | 50 |
| Juneau | 22,000 | 10,690 | 1,830 | 850 | 3,230 | 1,560 | 16,070 | 7,790 | 870 | 490 |
| Kenai Peninsula | 32,500 | 15,630 | 3,140 | 1,460 | 5,830 | 2,880 | 22,440 | 10,790 | 1,090 | 500 |
| Ketchikan Gateway | 12,400 | 5,930 | 1,060 | 520 | 1,920 | 970 | 8,700 | 4,060 | 720 | 380 |
| Kobuk | 5,100 | 2,360 | 580 | 280 | 1,050 | 480 | 3,200 | 1,470 | 270 | 130 |
| Kodiak Island | 12,700 | 5,670 | 1,370 | 590 | 1,910 | 980 | 9,070 | 3,910 | 350 | 190 |
| Matanuska-Susitna | 25,200 | 12,820 | 2,630 | 1,320 | 4,640 | 2,310 | 16,920 | 8,660 | 1,010 | 530 |
| Nome | 7,500 | 3,290 | 830 | 390 | 1,460 | 700 | 4,800 | 2,000 | 410 | 200 |
| North Slope | 4,800 | 2,070 | 470 | 230 | 790 | 410 | 3,370 | 1,340 | 170 | 90 |
| Prince of Wales-Outer Ketchikan | 4,400 | 2,060 | 450 | 200 | 760 | 350 | 2,980 | 1,310 | 210 | 200 |
| Sitka | 8,200 | 3,890 | 810 | 360 | 1,300 | 660 | 5,730 | 2,680 | 360 | 190 |
| Skagway-Yakutat-Angoon | 3,600 | 1,670 | 390 | 200 | 610 | 310 | 2,390 | 1,060 | 210 | 100 |
| Southeast Fairbanks | 6,100 | 2,720 | 690 | 380 | 1,120 | 520 | 4,130 | 1,740 | 160 | 80 |
| Valdez-Cordova | 9,500 | 4,210 | 840 | 410 | 1,480 | 700 | 6,830 | 2,960 | 350 | 140 |
| Wade Hampton | 4,800 | 2,310 | 540 | 270 | 1,170 | 570 | 2,890 | 1,380 | 200 | 90 |
| Wrangell-Petersburg | 6,700 | 3,100 | 620 | 320 | 1,080 | 510 | 4,610 | 2,090 | 390 | 180 |
| Yukon-Koyukuk | 7,900 | 3,430 | 760 | 340 | 1,350 | 690 | 5,480 | 2,270 | 310 | 130 |

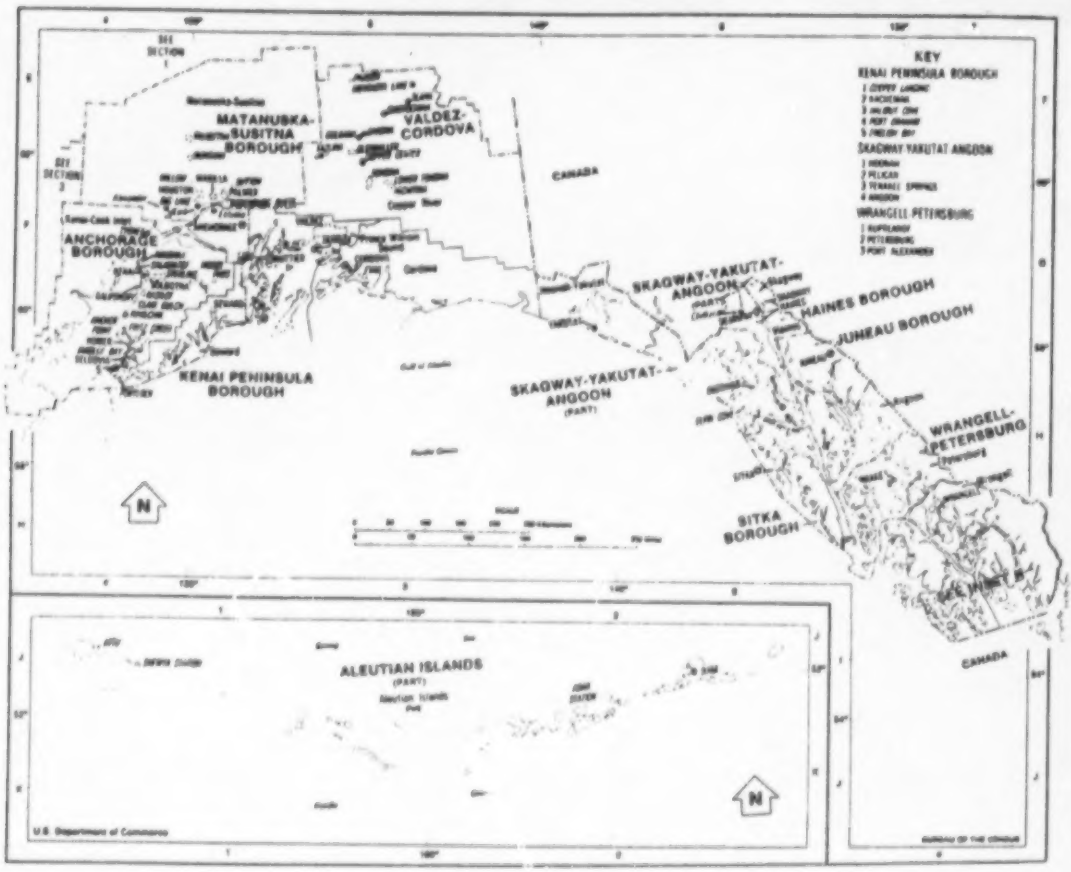
*The total population is a rounded figure.

**Standard Metropolitan Statistical Area, Boroughs, Census Areas, and Selected Places**

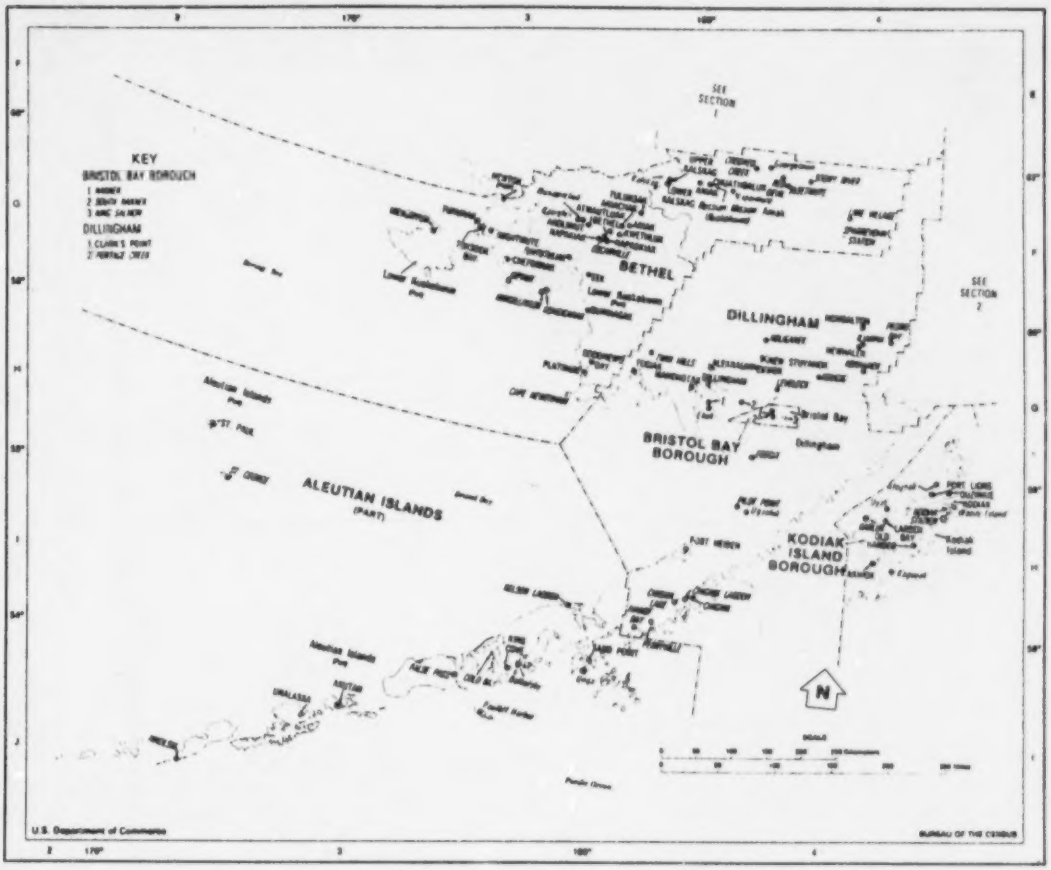
**Boroughs, American Indian Reservations, Alaska Native Villages, Census Areas, Borough and Census Area Subdivisions (Census Subareas), and Places—Section 1**



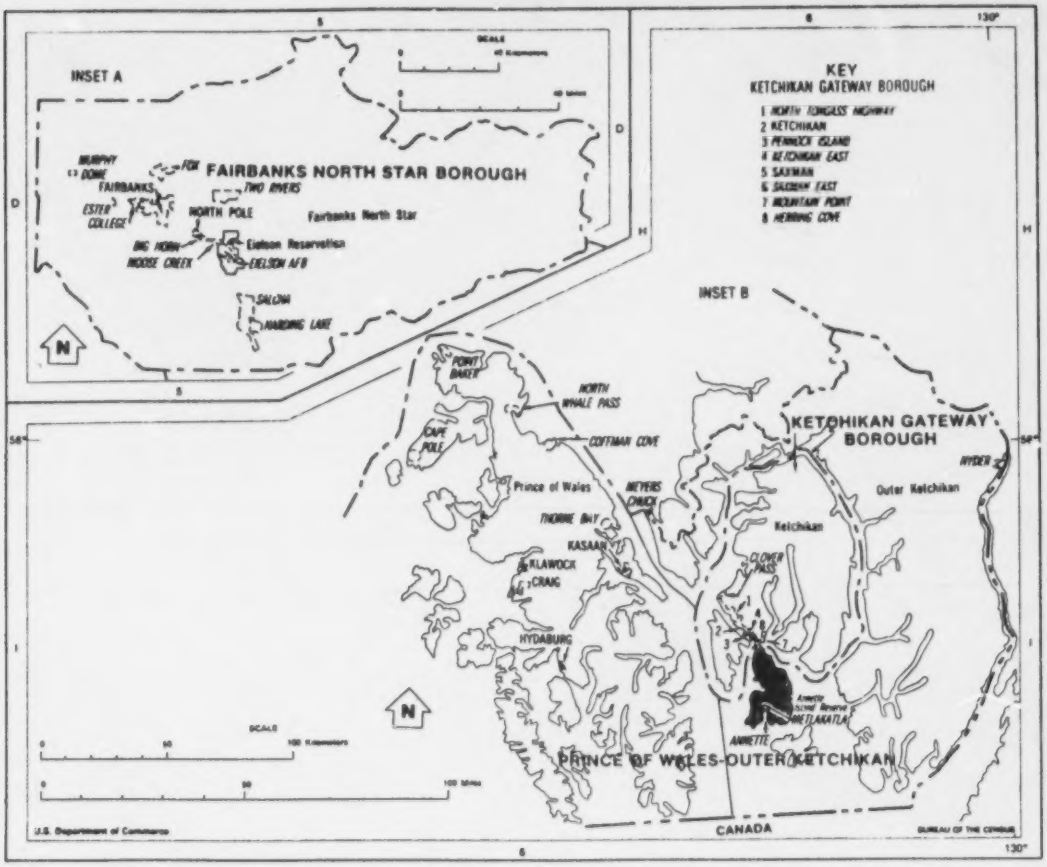
**Boroughs, American Indian Reservations, Alaska Native Villages, Census Areas, Borough and Census Area Subdivisions (Census Subareas), and Places—Section 2**



**Boroughs, American Indian Reservations, Alaska Native Villages, Census Areas, Borough and Census Area Subdivisions (Census Subareas), and Places—Section 3**



**Boroughs, American Indian Reservations, Alaska Native Villages, Census Areas, Borough and Census Area Subdivisions (Census Subareas), and Places—Insets A and B**



# II. ANNUAL POPULATION DATA, 1970 TO 1982

# II. ANNUAL POPULATION DATA, 1970 TO 1982

## Introduction

Because Alaska is a relatively new state, it lacks a comprehensive set of regional political boundaries equivalent to the county form of government found in the majority of states. As a consequence, Alaska lacks a consistent set of regional data going back in time. In this section, annual data from 1970 to 1982 are presented for the state, its boroughs and census areas. Included in this section are data on the annual population by sex and selected age groups, information on the annual components of change (births, deaths, and the net number of migrants), and active duty military personnel. The data are consistent with the definition of resident population used in the 1980 Decennial Census of Alaska. However, the data for 1980 vary from official 1980 figures released by the U.S. Bureau of the Census because: (1) they represent a July 1st rather than an April 1st date; and (2) they reflect revisions based on estimated undercounting discovered through certified census counts taken subsequent to the 1980 Decennial Census.

The technical documentation for the data in this section is found in Section IV. It describes certain limitations that should be understood before attempting to use the historical data for analytical purposes.

Table II.1

PERSONS BY AGE AND SEX FOR
ALASKA, EACH YEAR: 1970 to 1982

Alaska

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 308500 | 319600 | 329800 | 336400 | 348100 | 384100 | 409800 | 418000 | 411600 | 413700 | 419700 | 435200 | 460800 |
| Under 5 years | 32700 | 33570 | 34360 | 34720 | 35640 | 38800 | 41120 | 41600 | 40610 | 40510 | 40790 | 41980 | 44075 |
| 5 to 14 years | 72290 | 72640 | 72690 | 71890 | 72160 | 76950 | 79570 | 78790 | 75330 | 73510 | 72390 | 72860 | 74830 |
| 15 to 64 years | 196400 | 205890 | 214840 | 221540 | 231920 | 258700 | 278700 | 286650 | 284470 | 288050 | 294370 | 307420 | 327975 |
| 65 years & over | 7110 | 7500 | 7910 | 8250 | 8730 | 9570 | 10410 | 10960 | 11190 | 11630 | 12150 | 12940 | 13920 |
| FEMALES | 139960 | 145540 | 150780 | 154340 | 160320 | 177520 | 190680 | 194640 | 192480 | 194190 | 197730 | 206030 | 219160 |
| Under 5 years | 15900 | 16370 | 16750 | 16910 | 17350 | 18930 | 20020 | 20260 | 19760 | 19710 | 19830 | 20430 | 21400 |
| 5 to 14 years | 35330 | 35530 | 35520 | 35120 | 35210 | 37550 | 39280 | 38370 | 36660 | 35770 | 35210 | 35440 | 36400 |
| 15 to 64 years | 85640 | 90310 | 94960 | 98540 | 103740 | 116530 | 126380 | 130720 | 130580 | 132920 | 136590 | 143510 | 154020 |
| 65 years & over | 3090 | 3330 | 3550 | 3770 | 4020 | 4510 | 5000 | 5290 | 5480 | 5790 | 6100 | 6650 | 7340 |

Table II.2

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Aleutian Islands

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 7900 | 7900 | 7800 | 7700 | 7800 | 7900 | 7900 | 7900 | 8000 | 8000 | 8100 | 8300 | 8500 |
| Under 5 years | 600 | 600 | 600 | 600 | 610 | 620 | 630 | 630 | 640 | 650 | 660 | 680 | 700 |
| 5 to 14 years | 1220 | 1200 | 1160 | 1130 | 1120 | 1110 | 1090 | 1070 | 1070 | 1050 | 1040 | 1050 | 1050 |
| 15 to 64 years | 5980 | 6000 | 5940 | 5870 | 5960 | 6060 | 6070 | 6090 | 6170 | 6180 | 6290 | 6440 | 6620 |
| 65 years & over | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 110 | 120 | 120 | 120 | 130 | 130 |
| FEMALES | 2430 | 2510 | 2580 | 2630 | 2690 | 2770 | 2850 | 2900 | 3040 | 3110 | 3200 | 3320 | 3410 |
| Under 5 years | 280 | 280 | 280 | 280 | 280 | 290 | 290 | 300 | 300 | 310 | 320 | 330 | 340 |
| 5 to 14 years | 620 | 610 | 580 | 560 | 550 | 550 | 530 | 520 | 510 | 500 | 490 | 500 | 500 |
| 15 to 64 years | 1500 | 1590 | 1690 | 1750 | 1820 | 1890 | 1980 | 2030 | 2180 | 2240 | 2340 | 2420 | 2500 |
| 65 years & over | 30 | 30 | 30 | 40 | 40 | 40 | 50 | 50 | 50 | 60 | 60 | 70 | 70 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Anchorage

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 130200 | 136500 | 144000 | 146100 | 151000 | 173600 | 187400 | 189700 | 183600 | 180200 | 179000 | 184700 | 200500 |
| Under 5 years | 13650 | 14160 | 14780 | 14830 | 15160 | 17250 | 18420 | 18440 | 17660 | 17150 | 16850 | 17200 | 18470 |
| 5 to 14 years | 30110 | 30550 | 31190 | 30630 | 30640 | 34090 | 35620 | 34900 | 32690 | 31050 | 29850 | 29810 | 31320 |
| 15 to 64 years | 84660 | 89850 | 95900 | 98390 | 102790 | 119370 | 130120 | 132950 | 129820 | 128500 | 128680 | 133810 | 146330 |
| 65 years & over | 1780 | 1940 | 2130 | 2250 | 2410 | 2890 | 3240 | 3410 | 3430 | 3500 | 3620 | 3880 | 4380 |
| FEMALES | 61210 | 64290 | 67950 | 69090 | 71550 | 82460 | 89230 | 90550 | 87880 | 86510 | 86170 | 89190 | 97110 |
| Under 5 years | 6680 | 6930 | 7230 | 7250 | 7410 | 8430 | 9000 | 9010 | 8630 | 8380 | 8230 | 8400 | 9020 |
| 5 to 14 years | 14840 | 15030 | 15320 | 15020 | 15000 | 16660 | 17880 | 17000 | 15900 | 15080 | 14470 | 14430 | 15130 |
| 15 to 64 years | 38830 | 41380 | 44340 | 45680 | 47910 | 55870 | 61140 | 62720 | 61490 | 61120 | 61450 | 64160 | 70440 |
| 65 years & over | 860 | 950 | 1060 | 1140 | 1230 | 1500 | 1710 | 1820 | 1860 | 1930 | 2020 | 2200 | 2520 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Bethel

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 9000 | 9200 | 9400 | 9600 | 9800 | 10000 | 10200 | 10400 | 10500 | 10700 | 11000 | 11100 | 11300 |
| Under 5 years | 1190 | 1200 | 1210 | 1220 | 1230 | 1240 | 1250 | 1260 | 1250 | 1260 | 1280 | 1280 | 1280 |
| 5 to 14 years | 2840 | 2800 | 2760 | 2720 | 2670 | 2630 | 2590 | 2540 | 2480 | 2430 | 2410 | 2350 | 2300 |
| 15 to 64 years | 4650 | 4870 | 5090 | 5310 | 5540 | 5760 | 5980 | 6200 | 6370 | 6600 | 6880 | 7030 | 7270 |
| 65 years & over | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 400 | 400 | 410 | 430 | 440 | 450 |
| FEMALES | 4310 | 4410 | 4490 | 4580 | 4670 | 4760 | 4850 | 4930 | 4970 | 5060 | 5190 | 5230 | 5330 |
| Under 5 years | 600 | 610 | 610 | 610 | 620 | 620 | 620 | 630 | 620 | 620 | 630 | 630 | 630 |
| 5 to 14 years | 1390 | 1370 | 1350 | 1330 | 1310 | 1290 | 1270 | 1240 | 1210 | 1190 | 1180 | 1150 | 1130 |
| 15 to 64 years | 2190 | 2290 | 2390 | 2490 | 2590 | 2690 | 2790 | 2880 | 2960 | 3060 | 3180 | 3240 | 3350 |
| 65 years & over | 130 | 140 | 140 | 150 | 150 | 160 | 170 | 180 | 180 | 190 | 200 | 210 | 220 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Bristol Bay

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 1100 | 1100 | 1100 | 1200 | 1300 | 1200 | 1200 | 1200 | 1100 | 1100 | 1200 | 1200 | 1300 |
| Under 5 years | 80 | 80 | 80 | 80 | 90 | 80 | 80 | 80 | 70 | 70 | 70 | 70 | 70 |
| 5 to 14 years | 220 | 210 | 200 | 200 | 210 | 180 | 170 | 170 | 140 | 140 | 140 | 130 | 140 |
| 15 to 64 years | 770 | 780 | 790 | 890 | 970 | 910 | 920 | 920 | 860 | 860 | 960 | 970 | 1060 |
| 65 years & over | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| FEMALES | 360 | 370 | 370 | 410 | 440 | 410 | 420 | 420 | 390 | 390 | 430 | 440 | 480 |
| Under 5 years | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 30 | 30 | 30 | 30 | 30 |
| 5 to 14 years | 110 | 110 | 110 | 110 | 110 | 100 | 100 | 90 | 80 | 80 | 80 | 80 | 80 |
| 15 to 64 years | 200 | 210 | 210 | 250 | 280 | 260 | 270 | 280 | 270 | 270 | 310 | 320 | 360 |
| 65 years & over | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Dillingham

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 3900 | 4000 | 4100 | 4100 | 4200 | 4300 | 4400 | 4500 | 4500 | 4600 | 4700 | 4700 | 4700 |
| Under 5 years | 480 | 480 | 480 | 470 | 470 | 470 | 470 | 470 | 460 | 460 | 460 | 450 | 440 |
| 5 to 14 years | 1280 | 1250 | 1220 | 1170 | 1140 | 1110 | 1090 | 1060 | 1010 | 990 | 960 | 910 | 870 |
| 15 to 64 years | 2010 | 2140 | 2260 | 2320 | 2440 | 2570 | 2690 | 2810 | 2870 | 2980 | 3110 | 3170 | 3220 |
| 65 years & over | 130 | 130 | 140 | 140 | 150 | 150 | 150 | 160 | 160 | 170 | 170 | 170 | 170 |
| FEMALES | 1840 | 1840 | 1880 | 1910 | 1960 | 2010 | 2060 | 2110 | 2130 | 2170 | 2230 | 2240 | 2250 |
| Under 5 years | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 230 | 230 | 230 | 220 | 220 |
| 5 to 14 years | 590 | 590 | 570 | 550 | 540 | 530 | 520 | 510 | 490 | 480 | 470 | 450 | 430 |
| 15 to 64 years | 970 | 970 | 1030 | 1070 | 1130 | 1190 | 1250 | 1310 | 1350 | 1400 | 1470 | 1510 | 1540 |
| 65 years & over | 40 | 40 | 40 | 50 | 50 | 50 | 50 | 50 | 60 | 60 | 60 | 60 | 60 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Fairbanks-North Star

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 46500 | 47600 | 47800 | 48800 | 52000 | 56700 | 61500 | 62100 | 58200 | 57700 | 57800 | 58300 | 59200 |
| Under 5 years | 4820 | 4920 | 4930 | 5020 | 5340 | 5800 | 6280 | 6320 | 5910 | 5850 | 5840 | 5880 | 5950 |
| 5 to 14 years | 9610 | 9600 | 9400 | 9380 | 9760 | 10380 | 10990 | 10840 | 9910 | 9590 | 9380 | 9240 | 9150 |
| 15 to 64 years | 31480 | 32440 | 32780 | 33650 | 36050 | 39540 | 43090 | 43720 | 41160 | 40970 | 41210 | 41710 | 42510 |
| 65 years & over | 590 | 640 | 690 | 750 | 850 | 980 | 1140 | 1220 | 1220 | 1290 | 1370 | 1470 | 1590 |
| FEMALES | 19810 | 20430 | 20680 | 21270 | 20240 | 25110 | 27460 | 27960 | 26440 | 26430 | 26710 | 27190 | 27850 |
| Under 5 years | 2320 | 2380 | 2390 | 2440 | 2600 | 2830 | 3070 | 3100 | 2910 | 2890 | 2890 | 2920 | 2960 |
| 5 to 14 years | 4640 | 4630 | 4540 | 4530 | 4710 | 5010 | 5300 | 5230 | 4780 | 4620 | 4520 | 4450 | 4410 |
| 15 to 64 years | 12590 | 13130 | 13440 | 13960 | 15140 | 16810 | 18550 | 19050 | 18160 | 18300 | 18630 | 19090 | 19690 |
| 65 years & over | 260 | 290 | 310 | 340 | 390 | 460 | 540 | 580 | 590 | 620 | 670 | 730 | 790 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Haines

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 | 1600 | 1600 | 1700 | 1700 | 1700 | 1800 | 1900 |
| Under 5 years | 120 | 120 | 130 | 130 | 130 | 130 | 130 | 130 | 140 | 140 | 140 | 150 | 160 |
| 5 to 14 years | 350 | 340 | 350 | 330 | 320 | 310 | 320 | 310 | 310 | 300 | 290 | 300 | 300 |
| 15 to 64 years | 860 | 870 | 950 | 970 | 980 | 990 | 1070 | 1080 | 1170 | 1180 | 1190 | 1270 | 1350 |
| 65 years & over | 70 | 70 | 70 | 70 | 70 | 70 | 80 | 80 | 80 | 80 | 80 | 80 | 90 |
| FEMALES | 680 | 680 | 720 | 720 | 720 | 720 | 760 | 760 | 810 | 800 | 810 | 850 | 880 |
| Under 5 years | 60 | 60 | 60 | 60 | 60 | 60 | 70 | 70 | 70 | 70 | 70 | 80 | 80 |
| 5 to 14 years | 160 | 160 | 160 | 150 | 150 | 140 | 140 | 140 | 140 | 130 | 120 | 120 | 120 |
| 15 to 64 years | 420 | 420 | 460 | 470 | 470 | 480 | 510 | 510 | 560 | 560 | 570 | 600 | 630 |
| 65 years & over | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 50 | 50 | 50 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Juneau

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 13800 | 14600 | 15200 | 15700 | 16100 | 16400 | 17000 | 17500 | 18000 | 18900 | 19800 | 21100 | 22000 |
| Under 5 years | 1290 | 1370 | 1410 | 1440 | 1460 | 1470 | 1510 | 1540 | 1560 | 1620 | 1680 | 1770 | 1830 |
| 5 to 14 years | 3240 | 3350 | 3350 | 3320 | 3270 | 3200 | 3180 | 3150 | 3110 | 3130 | 3150 | 3220 | 3230 |
| 15 to 64 years | 8760 | 9330 | 9860 | 10340 | 10750 | 11100 | 11650 | 12130 | 12630 | 13410 | 14190 | 15270 | 16070 |
| 65 years & over | 510 | 550 | 580 | 600 | 620 | 630 | 660 | 680 | 700 | 740 | 780 | 840 | 870 |
| FEMALES | 6770 | 7150 | 7430 | 7680 | 7860 | 8000 | 8300 | 8530 | 8760 | 9200 | 9630 | 10260 | 10690 |
| Under 5 years | 640 | 670 | 690 | 700 | 710 | 710 | 730 | 740 | 740 | 770 | 790 | 830 | 850 |
| 5 to 14 years | 1630 | 1680 | 1670 | 1650 | 1620 | 1580 | 1570 | 1550 | 1520 | 1530 | 1530 | 1560 | 1560 |
| 15 to 64 years | 4250 | 4530 | 4780 | 5020 | 5210 | 5380 | 5650 | 5880 | 6120 | 6500 | 6880 | 7400 | 7790 |
| 65 years & over | 250 | 270 | 290 | 310 | 320 | 330 | 350 | 360 | 380 | 400 | 430 | 470 | 490 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Kenai Peninsula

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 16800 | 17200 | 17700 | 18400 | 19200 | 21300 | 22500 | 23900 | 24500 | 25800 | 27600 | 29500 | 32500 |
| Under 5 years | 1700 | 1730 | 1780 | 1840 | 1910 | 2120 | 2230 | 2360 | 2410 | 2520 | 2690 | 2860 | 3140 |
| 5 to 14 years | 3770 | 3790 | 3830 | 3900 | 4000 | 4350 | 4520 | 4710 | 4740 | 4900 | 5140 | 5390 | 5830 |
| 15 to 64 years | 10820 | 11150 | 11540 | 12090 | 12690 | 14160 | 15030 | 16060 | 16550 | 17540 | 18860 | 20270 | 22440 |
| 65 years & over | 510 | 530 | 550 | 570 | 600 | 670 | 720 | 770 | 800 | 840 | 910 | 980 | 1090 |
| FEMALES | 7130 | 7390 | 7670 | 8050 | 8490 | 9510 | 10150 | 10890 | 11280 | 12010 | 12980 | 14030 | 15630 |
| Under 5 years | 770 | 800 | 820 | 850 | 880 | 980 | 1030 | 1090 | 1120 | 1170 | 1250 | 1330 | 1460 |
| 5 to 14 years | 1790 | 1810 | 1830 | 1870 | 1930 | 2100 | 2190 | 2290 | 2310 | 2400 | 2520 | 2650 | 2880 |
| 15 to 64 years | 4380 | 4580 | 4810 | 5110 | 5440 | 6160 | 6630 | 7190 | 7510 | 8080 | 8810 | 9610 | 10790 |
| 65 years & over | 190 | 200 | 210 | 220 | 240 | 270 | 300 | 320 | 340 | 360 | 400 | 440 | 500 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Ketchikan Gateway

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 10200 | 10200 | 10300 | 10500 | 10700 | 10900 | 11200 | 11400 | 11600 | 11800 | 12000 | 12200 | 12400 |
| Under 5 years | 1060 | 1040 | 1040 | 1040 | 1040 | 1040 | 1060 | 1060 | 1060 | 1060 | 1060 | 1060 | 1060 |
| 5 to 14 years | 2390 | 2310 | 2250 | 2220 | 2180 | 2150 | 2130 | 2100 | 2060 | 2030 | 1990 | 1950 | 1920 |
| 15 to 64 years | 6220 | 6310 | 6460 | 6680 | 6900 | 7120 | 7400 | 7610 | 7830 | 8050 | 8270 | 8490 | 8700 |
| 65 years & over | 530 | 540 | 550 | 560 | 580 | 590 | 610 | 630 | 650 | 660 | 680 | 700 | 720 |
| FEMALES | 4890 | 4920 | 4960 | 5050 | 5150 | 5250 | 5380 | 5460 | 5560 | 5650 | 5740 | 5840 | 5930 |
| Under 5 years | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 |
| 5 to 14 years | 1170 | 1150 | 1120 | 1110 | 1090 | 1080 | 1070 | 1050 | 1030 | 1020 | 1000 | 980 | 970 |
| 15 to 64 years | 2960 | 3000 | 3060 | 3160 | 3260 | 3360 | 3490 | 3580 | 3680 | 3770 | 3870 | 3970 | 4060 |
| 65 years & over | 240 | 250 | 260 | 260 | 280 | 290 | 300 | 310 | 330 | 340 | 350 | 370 | 380 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Kobuk

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 4100 | 4200 | 4300 | 4400 | 4500 | 4600 | 4700 | 4800 | 4700 | 4800 | 4900 | 5000 | 5100 |
| Under 5 years | 580 | 580 | 590 | 590 | 590 | 600 | 600 | 600 | 580 | 580 | 580 | 580 | 580 |
| 5 to 14 years | 1360 | 1340 | 1320 | 1300 | 1270 | 1250 | 1230 | 1200 | 1130 | 1110 | 1090 | 1070 | 1050 |
| 15 to 64 years | 1970 | 2080 | 2190 | 2300 | 2420 | 2530 | 2640 | 2760 | 2750 | 2870 | 2980 | 3090 | 3200 |
| 65 years & over | 190 | 200 | 200 | 210 | 220 | 220 | 230 | 240 | 240 | 240 | 250 | 260 | 270 |
| FEMALES | 1970 | 2000 | 2040 | 2080 | 2130 | 2160 | 2200 | 2240 | 2200 | 2230 | 2270 | 2310 | 2360 |
| Under 5 years | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 280 | 280 | 280 | 280 | 280 |
| 5 to 14 years | 670 | 650 | 640 | 630 | 610 | 590 | 580 | 560 | 530 | 510 | 500 | 490 | 480 |
| 15 to 64 years | 910 | 960 | 1010 | 1060 | 1120 | 1170 | 1220 | 1270 | 1270 | 1320 | 1370 | 1420 | 1470 |
| 65 years & over | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 120 | 120 | 120 | 120 | 120 | 130 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Kodiak Island

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 9600 | 9700 | 9200 | 9300 | 9500 | 9700 | 9900 | 10100 | 10300 | 10600 | 11000 | 11700 | 12700 |
| Under 5 years | 1090 | 1100 | 1040 | 1040 | 1060 | 1080 | 1100 | 1120 | 1130 | 1160 | 1200 | 1270 | 1370 |
| 5 to 14 years | 2120 | 2070 | 1910 | 1860 | 1840 | 1820 | 1800 | 1780 | 1760 | 1750 | 1760 | 1810 | 1910 |
| 15 to 64 years | 6180 | 6310 | 6040 | 6180 | 6380 | 6570 | 6760 | 6950 | 7150 | 7420 | 7750 | 8310 | 9070 |
| 65 years & over | 210 | 220 | 210 | 220 | 220 | 230 | 240 | 250 | 260 | 270 | 290 | 310 | 350 |
| FEMALES | 4200 | 4250 | 4050 | 4090 | 4190 | 4280 | 4380 | 4470 | 4570 | 4710 | 4890 | 5220 | 5670 |
| Under 5 years | 530 | 530 | 500 | 490 | 500 | 500 | 510 | 510 | 510 | 520 | 530 | 560 | 590 |
| 5 to 14 years | 1020 | 1000 | 930 | 910 | 900 | 900 | 890 | 890 | 880 | 880 | 890 | 920 | 980 |
| 15 to 64 years | 2570 | 2630 | 2530 | 2590 | 2690 | 2770 | 2860 | 2950 | 3050 | 3170 | 3320 | 3570 | 3910 |
| 65 years & over | 80 | 90 | 90 | 100 | 100 | 110 | 120 | 120 | 130 | 140 | 150 | 170 | 190 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Matanuska-Susitna

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 6600 | 7200 | 7800 | 8500 | 9400 | 11100 | 13500 | 15500 | 16700 | 18400 | 20200 | 23300 | 25200 |
| Under 5 years | 580 | 640 | 710 | 780 | 880 | 1050 | 1290 | 1510 | 1650 | 1840 | 2050 | 2400 | 2630 |
| 5 to 14 years | 1700 | 1800 | 1900 | 2010 | 2160 | 2490 | 2940 | 3280 | 3440 | 3680 | 3930 | 4410 | 4640 |
| 15 to 64 years | 4010 | 4430 | 4830 | 5330 | 5940 | 7070 | 8680 | 10050 | 10900 | 12110 | 13390 | 15540 | 16920 |
| 65 years & over | 310 | 330 | 360 | 380 | 420 | 490 | 590 | 660 | 710 | 770 | 830 | 950 | 1018 |
| FEMALES | 3080 | 3380 | 3700 | 4050 | 4510 | 5380 | 6580 | 7610 | 8260 | 9160 | 10130 | 11790 | 12820 |
| Under 5 years | 290 | 320 | 360 | 390 | 440 | 530 | 650 | 760 | 830 | 920 | 1030 | 1210 | 1320 |
| 5 to 14 years | 810 | 860 | 910 | 970 | 1040 | 1210 | 1430 | 1600 | 1690 | 1810 | 1940 | 2190 | 2310 |
| 15 to 64 years | 1870 | 2080 | 2290 | 2540 | 2860 | 3430 | 4240 | 4950 | 5410 | 6060 | 6750 | 7900 | 8660 |
| 65 years & over | 110 | 120 | 140 | 150 | 170 | 210 | 260 | 300 | 330 | 370 | 410 | 490 | 530 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Nome

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 5800 | 5900 | 6000 | 6100 | 6200 | 6300 | 6400 | 6500 | 6500 | 6700 | 6900 | 7300 | 7500 |
| Under 5 years | 680 | 690 | 700 | 710 | 710 | 720 | 730 | 740 | 730 | 750 | 770 | 810 | 830 |
| 5 to 14 years | 1700 | 1670 | 1640 | 1620 | 1590 | 1560 | 1530 | 1500 | 1450 | 1450 | 1440 | 1470 | 1460 |
| 15 to 64 years | 3190 | 3300 | 3410 | 3510 | 3630 | 3730 | 3840 | 3950 | 4000 | 4160 | 4330 | 4630 | 4800 |
| 65 years & over | 230 | 240 | 250 | 260 | 270 | 290 | 300 | 310 | 320 | 340 | 360 | 390 | 410 |
| FEMALES | 2700 | 2740 | 2770 | 2800 | 2830 | 2860 | 2890 | 2920 | 2910 | 2980 | 3050 | 3210 | 3290 |
| Under 5 years | 310 | 320 | 320 | 330 | 330 | 330 | 340 | 340 | 340 | 350 | 360 | 380 | 390 |
| 5 to 14 years | 840 | 820 | 810 | 790 | 780 | 760 | 740 | 730 | 700 | 700 | 690 | 700 | 700 |
| 15 to 64 years | 1450 | 1490 | 1530 | 1560 | 1600 | 1640 | 1670 | 1710 | 1720 | 1770 | 1830 | 1940 | 2000 |
| 65 years & over | 100 | 110 | 110 | 120 | 120 | 130 | 140 | 140 | 150 | 160 | 170 | 190 | 200 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

North Slope

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4200 | 4400 | 4400 | 4500 | 4600 | 4700 | 4800 |
| Under 5 years | 400 | 410 | 410 | 420 | 420 | 430 | 440 | 460 | 450 | 460 | 460 | 460 | 470 |
| 5 to 14 years | 880 | 870 | 870 | 860 | 850 | 840 | 850 | 860 | 830 | 820 | 810 | 800 | 790 |
| 15 to 64 years | 2110 | 2210 | 2300 | 2400 | 2500 | 2600 | 2770 | 2930 | 2970 | 3060 | 3170 | 3270 | 3370 |
| 65 years & over | 110 | 110 | 120 | 120 | 130 | 130 | 140 | 150 | 150 | 160 | 160 | 170 | 170 |
| FEMALES | 1560 | 1620 | 1650 | 1690 | 1730 | 1770 | 1840 | 1930 | 1930 | 1960 | 2000 | 2050 | 2070 |
| Under 5 years | 200 | 210 | 210 | 210 | 210 | 220 | 220 | 230 | 230 | 230 | 230 | 230 | 230 |
| 5 to 14 years | 440 | 440 | 440 | 440 | 430 | 430 | 430 | 440 | 430 | 420 | 420 | 420 | 410 |
| 15 to 64 years | 880 | 920 | 950 | 990 | 1030 | 1060 | 1130 | 1190 | 1200 | 1230 | 1270 | 1310 | 1340 |
| 65 years & over | 40 | 50 | 50 | 50 | 60 | 60 | 60 | 70 | 70 | 80 | 80 | 90 | 90 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Prince of Wales-Outer Ketchikan

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 3700 | 4000 | 4000 | 4100 | 4200 | 4300 | 4300 | 4100 | 4100 | 4200 | 4300 | 4400 | 4400 |
| Under 5 years | 370 | 400 | 400 | 410 | 420 | 440 | 440 | 420 | 420 | 430 | 440 | 450 | 450 |
| 5 to 14 years | 910 | 960 | 930 | 920 | 920 | 910 | 890 | 820 | 800 | 790 | 790 | 790 | 760 |
| 15 to 64 years | 2280 | 2490 | 2510 | 2610 | 2690 | 2770 | 2790 | 2680 | 2700 | 2790 | 2870 | 2950 | 2980 |
| 65 years & over | 140 | 150 | 160 | 160 | 170 | 180 | 180 | 180 | 180 | 190 | 200 | 210 | 210 |
| FEMALES | 1580 | 1710 | 1710 | 1770 | 1810 | 1870 | 1880 | 1790 | 1800 | 1850 | 1900 | 1960 | 2060 |
| Under 5 years | 180 | 190 | 190 | 200 | 200 | 210 | 210 | 200 | 200 | 200 | 200 | 200 | 200 |
| 5 to 14 years | 450 | 470 | 450 | 450 | 440 | 440 | 430 | 390 | 380 | 370 | 370 | 370 | 350 |
| 15 to 64 years | 890 | 980 | 1000 | 1050 | 1090 | 1140 | 1160 | 1120 | 1140 | 1190 | 1240 | 1290 | 1310 |
| 65 years & over | 60 | 70 | 70 | 70 | 80 | 80 | 80 | 80 | 80 | 90 | 90 | 100 | 200 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Sitka

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 6200 | 6100 | 6300 | 6500 | 6700 | 6900 | 7100 | 7400 | 7600 | 7700 | 7800 | 8000 | 8200 |
| Under 5 years | 780 | 750 | 760 | 770 | 780 | 780 | 790 | 810 | 810 | 810 | 800 | 800 | 810 |
| 5 to 14 years | 1550 | 1470 | 1460 | 1450 | 1440 | 1430 | 1410 | 1420 | 1400 | 1360 | 1330 | 1310 | 1300 |
| 15 to 64 years | 3510 | 3520 | 3720 | 3920 | 4120 | 4330 | 4540 | 4810 | 5030 | 5170 | 5310 | 5530 | 5730 |
| 65 years & over | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 |
| FEMALES | 2920 | 2880 | 2970 | 3060 | 3160 | 3270 | 3360 | 3490 | 3590 | 3640 | 3690 | 3780 | 3890 |
| Under 5 years | 360 | 350 | 350 | 350 | 360 | 360 | 360 | 370 | 370 | 370 | 360 | 360 | 360 |
| 5 to 14 years | 770 | 730 | 730 | 720 | 720 | 720 | 710 | 710 | 700 | 680 | 670 | 660 | 660 |
| 15 to 64 years | 1640 | 1640 | 1730 | 1830 | 1920 | 2020 | 2120 | 2240 | 2350 | 2410 | 2480 | 2580 | 2680 |
| 65 years & over | 150 | 160 | 160 | 160 | 160 | 170 | 170 | 170 | 170 | 180 | 180 | 180 | 190 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Skagway-Yakutat-Angoon

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 2800 | 2900 | 2900 | 2900 | 2900 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 |
| Under 5 years | 330 | 340 | 340 | 330 | 330 | 330 | 340 | 350 | 350 | 360 | 370 | 380 | 390 |
| 5 to 14 years | 680 | 680 | 660 | 640 | 620 | 610 | 610 | 610 | 610 | 610 | 610 | 610 | 610 |
| 15 to 64 years | 1670 | 1750 | 1770 | 1790 | 1810 | 1820 | 1900 | 1980 | 2070 | 2150 | 2230 | 2310 | 2390 |
| 65 years & over | 120 | 130 | 130 | 140 | 140 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 |
| FEMALES | 1400 | 1440 | 1430 | 1430 | 1420 | 1420 | 1460 | 1480 | 1530 | 1570 | 1600 | 1650 | 1670 |
| Under 5 years | 170 | 180 | 180 | 170 | 170 | 170 | 180 | 180 | 180 | 190 | 190 | 200 | 200 |
| 5 to 14 years | 320 | 330 | 320 | 310 | 300 | 300 | 300 | 300 | 300 | 310 | 310 | 310 | 310 |
| 15 to 64 years | 860 | 880 | 880 | 890 | 890 | 890 | 910 | 930 | 970 | 990 | 1010 | 1040 | 1060 |
| 65 years & over | 50 | 50 | 50 | 60 | 60 | 60 | 70 | 70 | 80 | 80 | 90 | 100 | 100 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Southeast Fairbanks

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 4300 | 5000 | 5200 | 5300 | 5300 | 5400 | 5500 | 5600 | 5700 | 5800 | 5900 | 6000 | 6100 |
| Under 5 years | 450 | 530 | 550 | 570 | 570 | 580 | 600 | 610 | 630 | 640 | 660 | 680 | 690 |
| 5 to 14 years | 960 | 1100 | 1120 | 1120 | 1110 | 1110 | 1110 | 1110 | 1110 | 1110 | 1110 | 1120 | 1120 |
| 15 to 64 years | 2790 | 3250 | 3410 | 3480 | 3490 | 3580 | 3650 | 3740 | 3820 | 3900 | 3980 | 4050 | 4130 |
| 65 years & over | 100 | 120 | 120 | 130 | 130 | 130 | 140 | 140 | 140 | 150 | 150 | 150 | 160 |
| FEMALES | 1790 | 2090 | 2190 | 2240 | 2250 | 2310 | 2360 | 2420 | 2480 | 2540 | 2600 | 2650 | 2720 |
| Under 5 years | 230 | 270 | 290 | 300 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 |
| 5 to 14 years | 450 | 520 | 530 | 530 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 |
| 15 to 64 years | 1070 | 1250 | 1320 | 1360 | 1380 | 1430 | 1460 | 1510 | 1560 | 1600 | 1650 | 1690 | 1740 |
| 65 years & over | 40 | 50 | 50 | 50 | 50 | 50 | 60 | 60 | 60 | 70 | 70 | 70 | 80 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Valdez-Cordova

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 5000 | 5200 | 5300 | 5400 | 5500 | 8000 | 8900 | 8500 | 8700 | 8900 | 9100 | 9300 | 9500 |
| Under 5 years | 430 | 450 | 460 | 470 | 480 | 700 | 780 | 740 | 760 | 780 | 800 | 820 | 840 |
| 5 to 14 years | 1010 | 1030 | 1030 | 1020 | 1020 | 1450 | 1580 | 1480 | 1480 | 1480 | 1480 | 1480 | 1480 |
| 15 to 64 years | 3400 | 3550 | 3630 | 3720 | 3800 | 5630 | 6300 | 6020 | 6170 | 6320 | 6490 | 6660 | 6830 |
| 65 years & over | 160 | 170 | 180 | 190 | 200 | 220 | 240 | 260 | 290 | 320 | 330 | 340 | 350 |
| FEMALES | 2260 | 2350 | 2390 | 2440 | 2470 | 3600 | 4000 | 3810 | 3880 | 3960 | 4040 | 4130 | 4210 |
| Under 5 years | 210 | 220 | 220 | 230 | 230 | 340 | 380 | 360 | 370 | 380 | 390 | 400 | 410 |
| 5 to 14 years | 490 | 500 | 500 | 500 | 490 | 700 | 760 | 710 | 700 | 700 | 700 | 700 | 700 |
| 15 to 64 years | 1500 | 1570 | 1600 | 1640 | 1670 | 2470 | 2760 | 2630 | 2690 | 2750 | 2820 | 2890 | 2960 |
| 65 years & over | 60 | 60 | 70 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 130 | 140 | 140 |

Table 11.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Wade Hampton

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 4000 | 4000 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 | 4500 | 4600 | 4700 | 4800 | 4800 |
| Under 5 years | 630 | 610 | 600 | 600 | 600 | 590 | 590 | 580 | 570 | 560 | 560 | 550 | 540 |
| 5 to 14 years | 1280 | 1250 | 1220 | 1230 | 1230 | 1230 | 1230 | 1230 | 1210 | 1200 | 1190 | 1180 | 1170 |
| 15 to 64 years | 1990 | 2040 | 2070 | 2150 | 2240 | 2350 | 2440 | 2540 | 2560 | 2670 | 2770 | 2880 | 2890 |
| 65 years & over | 100 | 100 | 110 | 120 | 130 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
| FEMALES | 1870 | 1880 | 1880 | 1930 | 1980 | 2030 | 2080 | 2140 | 2130 | 2200 | 2250 | 2310 | 2310 |
| Under 5 years | 310 | 300 | 300 | 300 | 300 | 290 | 290 | 290 | 280 | 280 | 280 | 280 | 270 |
| 5 to 14 years | 610 | 600 | 580 | 590 | 590 | 590 | 590 | 590 | 580 | 580 | 580 | 570 | 570 |
| 15 to 64 years | 910 | 940 | 950 | 990 | 1040 | 1090 | 1140 | 1190 | 1200 | 1260 | 1310 | 1370 | 1380 |
| 65 years & over | 40 | 40 | 50 | 50 | 50 | 60 | 60 | 70 | 70 | 80 | 80 | 90 | 90 |

Table 11.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Wrangell-Petersburg

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 5000 | 5000 | 5100 | 5200 | 5300 | 5400 | 5500 | 5700 | 5900 | 6100 | 6300 | 6500 | 6700 |
| Under 5 years | 550 | 540 | 550 | 550 | 550 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 |
| 5 to 14 years | 1190 | 1150 | 1140 | 1120 | 1110 | 1090 | 1080 | 1080 | 1080 | 1080 | 1080 | 1080 | 1080 |
| 15 to 64 years | 3000 | 3050 | 3140 | 3250 | 3350 | 3470 | 3560 | 3730 | 3910 | 4080 | 4260 | 4430 | 4610 |
| 65 years & over | 260 | 260 | 270 | 280 | 290 | 290 | 300 | 320 | 330 | 350 | 360 | 380 | 390 |
| FEMALES | 2310 | 2310 | 2360 | 2410 | 2460 | 2500 | 2560 | 2640 | 2740 | 2830 | 2920 | 3020 | 3100 |
| Under 5 years | 270 | 270 | 280 | 280 | 280 | 280 | 290 | 290 | 300 | 300 | 310 | 320 | 320 |
| 5 to 14 years | 580 | 560 | 550 | 540 | 540 | 530 | 520 | 520 | 520 | 520 | 520 | 520 | 510 |
| 15 to 64 years | 1350 | 1370 | 1410 | 1460 | 1510 | 1560 | 1610 | 1680 | 1770 | 1850 | 1930 | 2010 | 2090 |
| 65 years & over | 110 | 110 | 120 | 130 | 130 | 130 | 140 | 150 | 150 | 160 | 160 | 170 | 180 |

Table II.2 (continued)

PERSONS BY AGE AND SEX FOR BOROUGHS AND
CENSUS AREAS IN ALASKA, EACH YEAR: 1970 to 1982

Yukon-Koyukuk

| | July 1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| TOTAL PERSONS | 7100 | 7100 | 7100 | 7200 | 7300 | 7400 | 7500 | 7600 | 7600 | 7600 | 7700 | 7800 | 7900 |
| Under 5 years | 840 | 830 | 810 | 810 | 810 | 810 | 800 | 800 | 790 | 770 | 770 | 770 | 760 |
| 5 to 14 years | 1920 | 1850 | 1780 | 1740 | 1690 | 1650 | 1610 | 1570 | 1510 | 1460 | 1420 | 1380 | 1350 |
| 15 to 64 years | 4090 | 4170 | 4250 | 4390 | 4530 | 4670 | 4810 | 4940 | 5010 | 5080 | 5210 | 5340 | 5480 |
| 65 years & over | 250 | 250 | 260 | 260 | 270 | 270 | 280 | 290 | 290 | 290 | 300 | 310 | 310 |
| FEMALES | 2890 | 2900 | 2910 | 2960 | 3010 | 3070 | 3130 | 3190 | 3200 | 3230 | 3290 | 3360 | 3430 |
| Under 5 years | 400 | 390 | 380 | 380 | 380 | 380 | 370 | 370 | 360 | 350 | 350 | 350 | 340 |
| 5 to 14 years | 940 | 910 | 880 | 860 | 840 | 820 | 810 | 790 | 760 | 740 | 720 | 700 | 690 |
| 15 to 64 years | 1450 | 1500 | 1550 | 1620 | 1690 | 1770 | 1840 | 1920 | 1970 | 2020 | 2100 | 2180 | 2270 |
| 65 years & over | 100 | 100 | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 120 | 120 | 130 | 130 |

Table II.3

Components of Population Change for Alaska, Each Year: 1970 to 1982

Alaska

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 308500 | 7190 | 1370 | 5280 |
| 1970-71 | 319600 | 7710 | 1440 | 3930 |
| 1971-72 | 329800 | 6880 | 1560 | 1280 |
| 1972-73 | 336400 | 6840 | 1430 | 6690 |
| 1973-74 | 348500 | 6760 | 1450 | 30290 |
| 1974-75 | 384100 | 7150 | 1490 | 20040 |
| 1975-76 | 409800 | 7740 | 1550 | 2010 |
| 1976-77 | 418000 | 8230 | 1620 | -13010 |
| 1977-78 | 411600 | 8590 | 1620 | -4870 |
| 1978-79 | 413700 | 9030 | 1680 | -1350 |
| 1979-80 | 419700 | 9310 | 1660 | 7850 |
| 1980-81 | 435200 | 9750 | 1690 | 17540 |
| 1981-82 | 460800 | - | - | - |

## Exhibit II.1
## Births, Deaths, and Net Migrants: Numbers per 1,000 Persons Alaska, 1971 to 1982

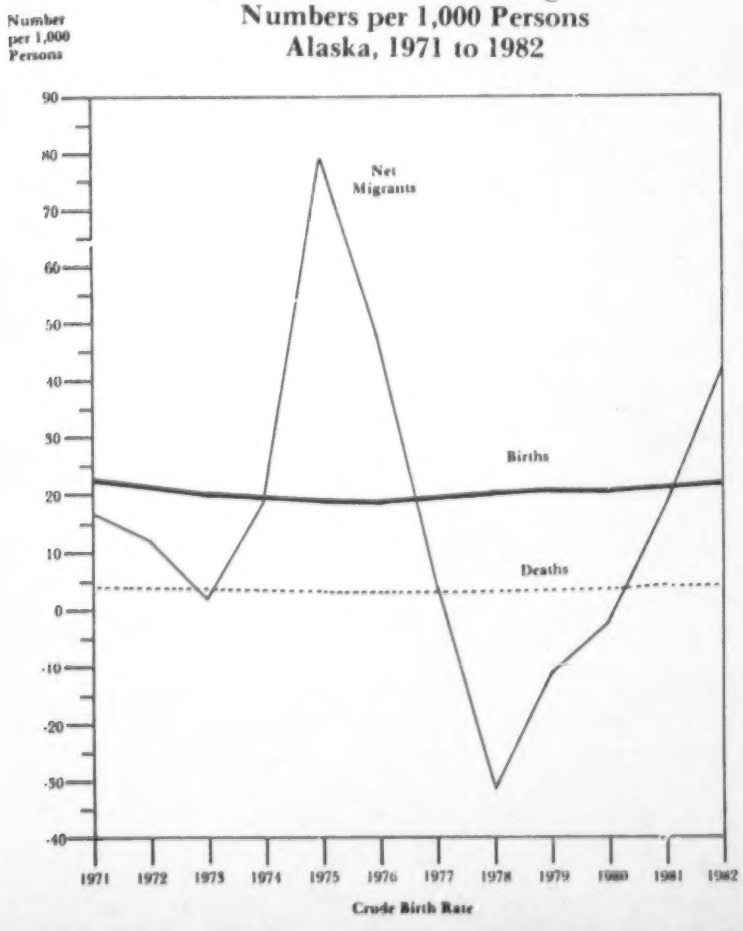


Table II.4

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Aleutian Islands

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 7900 | 130 | 20 | -110 |
| 1970-71 | 7900 | 130 | 20 | -250 |
| 1971-72 | 7800 | 110 | 20 | -190 |
| 1972-73 | 7700 | 120 | 20 | 0 |
| 1973-74 | 7800 | 130 | 20 | -10 |
| 1974-75 | 7900 | 130 | 20 | -110 |
| 1975-76 | 7900 | 120 | 20 | -100 |
| 1976-77 | 7900 | 130 | 30 | 0 |
| 1977-78 | 8000 | 120 | 20 | -100 |
| 1978-79 | 8000 | 130 | 20 | -10 |
| 1979-80 | 8100 | 140 | 20 | 80 |
| 1980-81 | 8300 | 190 | 30 | 40 |
| 1981-82 | 8500 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Anchorage

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 130200 | 3120 | 440 | 3620 |
| 1970-71 | 136500 | 3330 | 460 | 4630 |
| 1971-72 | 144000 | 2990 | 510 | -380 |
| 1972-73 | 146100 | 3130 | 480 | 2250 |
| 1973-74 | 151000 | 2980 | 490 | 20110 |
| 1974-75 | 173600 | 3170 | 490 | 11120 |
| 1975-76 | 187400 | 3370 | 540 | -530 |
| 1976-77 | 189700 | 3630 | 520 | -9210 |
| 1977-78 | 183600 | 3750 | 570 | -6580 |
| 1978-79 | 180200 | 3840 | 560 | -4480 |
| 1979-80 | 179000 | 3830 | 550 | 2420 |
| 1980-81 | 184700 | 4030 | 580 | 12350 |
| 1981-82 | 200500 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Bethel

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 9000 | 200 | 50 | 50 |
| 1970-71 | 9200 | 260 | 50 | -10 |
| 1971-72 | 9400 | 240 | 50 | 10 |
| 1972-73 | 9600 | 240 | 60 | 20 |
| 1973-74 | 9800 | 250 | 60 | 10 |
| 1974-75 | 10000 | 220 | 50 | 30 |
| 1975-76 | 10200 | 220 | 50 | 30 |
| 1976-77 | 10400 | 230 | 70 | -60 |
| 1977-78 | 10500 | 250 | 50 | 0 |
| 1978-79 | 10700 | 280 | 60 | 80 |
| 1979-80 | 11000 | 290 | 60 | -130 |
| 1980-81 | 11100 | 300 | 70 | -30 |
| 1981-82 | 11300 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Bristol Bay

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 1100 | 20 | 10 | -10 |
| 1970-71 | 1100 | 20 | 0 | -20 |
| 1971-72 | 1100 | 10 | 10 | 100 |
| 1972-73 | 1200 | 10 | 0 | 90 |
| 1973-74 | 1300 | 20 | 10 | -110 |
| 1974-75 | 1200 | 20 | 0 | -20 |
| 1975-76 | 1200 | 10 | 10 | 0 |
| 1976-77 | 1200 | 20 | 10 | -110 |
| 1977-78 | 1100 | 20 | 0 | -20 |
| 1978-79 | 1100 | 20 | 0 | -20 |
| 1979-80 | 1200 | 20 | 0 | -20 |
| 1980-81 | 1200 | 20 | 0 | 80 |
| 1981-82 | 1300 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Dillingham

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 3900 | 100 | 30 | 30 |
| 1970-71 | 4000 | 80 | 30 | 50 |
| 1971-72 | 4100 | 70 | 30 | -40 |
| 1972-73 | 4100 | 90 | 20 | 30 |
| 1973-74 | 4200 | 90 | 30 | 40 |
| 1974-75 | 4300 | 80 | 30 | 50 |
| 1975-76 | 4400 | 80 | 20 | 40 |
| 1976-77 | 4500 | 100 | 30 | -70 |
| 1977-78 | 4500 | 90 | 30 | 40 |
| 1978-79 | 4600 | 110 | 20 | 10 |
| 1979-80 | 4700 | 110 | 30 | -80 |
| 1980-81 | 4700 | 140 | 20 | -120 |
| 1981-82 | 4700 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Fairbanks North Star

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 46500 | 1250 | 170 | 20 |
| 1970-71 | 47600 | 1380 | 190 | -990 |
| 1971-72 | 47800 | 1190 | 170 | -20 |
| 1972-73 | 48800 | 1120 | 150 | 2230 |
| 1973-74 | 52000 | 1080 | 180 | 3800 |
| 1974-75 | 56700 | 1110 | 160 | 3850 |
| 1975-76 | 61500 | 1260 | 180 | -480 |
| 1976-77 | 62100 | 1320 | 210 | -5010 |
| 1977-78 | 58200 | 1350 | 200 | -1650 |
| 1978-79 | 57700 | 1330 | 190 | -1040 |
| 1979-80 | 57800 | 1350 | 190 | -660 |
| 1980-81 | 58300 | 1480 | 180 | -400 |
| 1981-82 | 59200 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Haines

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 1400 | 30 | 10 | -20 |
| 1970-71 | 1400 | 40 | 10 | 70 |
| 1971-72 | 1500 | 20 | 20 | 0 |
| 1972-73 | 1500 | 30 | 10 | -20 |
| 1973-74 | 1500 | 30 | 10 | -20 |
| 1974-75 | 1500 | 20 | 10 | 90 |
| 1975-76 | 1600 | 20 | 10 | -10 |
| 1976-77 | 1600 | 20 | 10 | 80 |
| 1977-78 | 1700 | 30 | 10 | -20 |
| 1978-79 | 1700 | 30 | 10 | -20 |
| 1979-80 | 1700 | 40 | 10 | 70 |
| 1980-81 | 1800 | 40 | 10 | 70 |
| 1981-82 | 1900 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Juneau

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 13800 | 260 | 60 | 600 |
| 1970-71 | 14600 | 240 | 80 | 440 |
| 1971-72 | 15200 | 250 | 90 | 340 |
| 1972-73 | 15700 | 270 | 100 | 230 |
| 1973-74 | 16100 | 250 | 70 | 120 |
| 1974-75 | 16400 | 300 | 90 | 390 |
| 1975-76 | 17000 | 300 | 60 | 260 |
| 1976-77 | 17500 | 290 | 90 | 300 |
| 1977-78 | 18000 | 310 | 90 | 680 |
| 1978-79 | 18900 | 370 | 70 | 600 |
| 1979-80 | 19800 | 400 | 70 | 970 |
| 1980-81 | 21100 | 460 | 80 | 520 |
| 1981-82 | 22000 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Kenai Peninsula

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 16800 | 360 | 90 | 130 |
| 1970-71 | 17200 | 360 | 80 | 220 |
| 1971-72 | 17700 | 300 | 80 | 480 |
| 1972-73 | 18400 | 270 | 90 | 620 |
| 1973-74 | 19200 | 290 | 90 | 1900 |
| 1974-75 | 21300 | 340 | 90 | 950 |
| 1975-76 | 22500 | 400 | 100 | 1100 |
| 1976-77 | 23900 | 490 | 90 | 200 |
| 1977-78 | 24500 | 530 | 100 | 870 |
| 1978-79 | 25800 | 580 | 110 | 1330 |
| 1979-80 | 27600 | 580 | 110 | 1430 |
| 1980-81 | 29500 | 610 | 80 | 2470 |
| 1981-82 | 32500 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Ketchikan Gateway

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 10200 | 230 | 80 | -150 |
| 1970-71 | 10200 | 280 | 80 | -100 |
| 1971-72 | 10300 | 190 | 80 | 90 |
| 1972-73 | 10500 | 190 | 80 | 90 |
| 1973-74 | 10700 | 180 | 60 | 80 |
| 1974-75 | 10900 | 220 | 70 | 150 |
| 1975-76 | 11200 | 200 | 80 | 80 |
| 1976-77 | 11400 | 210 | 70 | 60 |
| 1977-78 | 11600 | 210 | 70 | 60 |
| 1978-79 | 11800 | 240 | 70 | 30 |
| 1979-80 | 12000 | 260 | 70 | 10 |
| 1980-81 | 12200 | 240 | 60 | 20 |
| 1981-82 | 12400 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Kobuk

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 4100 | 90 | 20 | 30 |
| 1970-71 | 4200 | 110 | 20 | 10 |
| 1971-72 | 4300 | 100 | 30 | 30 |
| 1972-73 | 4400 | 120 | 30 | 10 |
| 1973-74 | 4500 | 110 | 20 | 10 |
| 1974-75 | 4600 | 110 | 20 | 10 |
| 1975-76 | 4700 | 130 | 30 | 0 |
| 1976-77 | 4800 | 110 | 30 | -180 |
| 1977-78 | 4700 | 130 | 30 | 0 |
| 1978-79 | 4800 | 160 | 40 | -20 |
| 1979-80 | 4900 | 130 | 40 | 10 |
| 1980-81 | 5000 | 160 | 40 | -20 |
| 1981-82 | 5100 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Kodiak Island

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 9600 | 260 | 60 | -100 |
| 1970-71 | 9700 | 270 | 60 | -710 |
| 1971-72 | 9200 | 250 | 50 | -100 |
| 1972-73 | 9300 | 200 | 30 | 30 |
| 1973-74 | 9500 | 190 | 50 | 60 |
| 1974-75 | 9700 | 200 | 60 | 60 |
| 1975-76 | 9900 | 210 | 40 | 30 |
| 1976-77 | 10100 | 230 | 50 | 20 |
| 1977-78 | 10300 | 220 | 40 | 120 |
| 1978-79 | 10600 | 250 | 60 | 210 |
| 1979-80 | 11000 | 310 | 50 | 440 |
| 1980-81 | 11700 | 250 | 50 | 800 |
| 1981-82 | 12700 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Matanuska-Susitna

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 6600 | 110 | 40 | 530 |
| 1970-71 | 7200 | 130 | 50 | 520 |
| 1971-72 | 7800 | 140 | 40 | 600 |
| 1972-73 | 8500 | 130 | 30 | 800 |
| 1973-74 | 9400 | 140 | 40 | 1600 |
| 1974-75 | 11100 | 170 | 60 | 2290 |
| 1975-76 | 13500 | 210 | 70 | 1860 |
| 1976-77 | 15500 | 250 | 70 | 1020 |
| 1977-78 | 16700 | 340 | 90 | 1450 |
| 1978-79 | 18400 | 380 | 80 | 1500 |
| 1979-80 | 20200 | 410 | 80 | 2770 |
| 1980-81 | 23300 | 360 | 80 | 1620 |
| 1981-82 | 25200 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Nome

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 5800 | 160 | 50 | -10 |
| 1970-71 | 5900 | 120 | 50 | 30 |
| 1971-72 | 6000 | 150 | 50 | 0 |
| 1972-73 | 6100 | 140 | 50 | 10 |
| 1973-74 | 6200 | 150 | 60 | 10 |
| 1974-75 | 6300 | 170 | 50 | -20 |
| 1975-76 | 6400 | 160 | 60 | 0 |
| 1976-77 | 6500 | 160 | 50 | -110 |
| 1977-78 | 6500 | 170 | 50 | 80 |
| 1978-79 | 6700 | 160 | 60 | 100 |
| 1979-80 | 6900 | 190 | 50 | 260 |
| 1980-81 | 7300 | 220 | 60 | 40 |
| 1981-82 | 7500 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas in Alaska, Each Year: 1970 to 1982

North Slope

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 3500 | 80 | 20 | 40 |
| 1970-71 | 3600 | 80 | 20 | 40 |
| 1971-72 | 3700 | 80 | 30 | 50 |
| 1972-73 | 3800 | 60 | 30 | 70 |
| 1973-74 | 3900 | 70 | 20 | 50 |
| 1974-75 | 4000 | 70 | 30 | 160 |
| 1975-76 | 4200 | 80 | 20 | 140 |
| 1976-77 | 4400 | 80 | 20 | -60 |
| 1977-78 | 4400 | 90 | 20 | 30 |
| 1978-79 | 4500 | 110 | 30 | 20 |
| 1979-80 | 4600 | 100 | 30 | 30 |
| 1980-81 | 4700 | 100 | 40 | 40 |
| 1981-82 | 4800 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas in Alaska, Each Year: 1970 to 1982

Prince of Wales - Outer Ketchikan

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 3700 | 70 | 30 | 260 |
| 1970-71 | 4000 | 70 | 20 | -50 |
| 1971-72 | 4000 | 60 | 30 | 70 |
| 1972-73 | 4100 | 60 | 30 | 70 |
| 1973-74 | 4200 | 70 | 20 | 50 |
| 1974-75 | 4300 | 70 | 20 | -50 |
| 1975-76 | 4300 | 60 | 20 | -240 |
| 1976-77 | 4100 | 50 | 30 | -20 |
| 1977-78 | 4100 | 70 | 20 | 50 |
| 1978-79 | 4200 | 90 | 30 | 40 |
| 1979-80 | 4300 | 100 | 40 | 40 |
| 1980-81 | 4400 | 90 | 20 | -70 |
| 1981-82 | 4400 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Sitka

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 6200 | 120 | 30 | -190 |
| 1970-71 | 6100 | 120 | 30 | 110 |
| 1971-72 | 6300 | 110 | 50 | 140 |
| 1972-73 | 6500 | 110 | 20 | 110 |
| 1973-74 | 6700 | 110 | 40 | 130 |
| 1974-75 | 6900 | 110 | 40 | 130 |
| 1975-76 | 7100 | 150 | 40 | 190 |
| 1976-77 | 7400 | 140 | 30 | 90 |
| 1977-78 | 7600 | 150 | 40 | -10 |
| 1978-79 | 7700 | 180 | 50 | -30 |
| 1979-80 | 7800 | 200 | 50 | 50 |
| 1980-81 | 8000 | 240 | 40 | 0 |
| 1981-82 | 8200 | - | - | - |

Table II.4 (:ontinued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Skagway-Yakutat-Angoon

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 2800 | 50 | 20 | 70 |
| 1970-71 | 2900 | 60 | 20 | -40 |
| 1971-72 | 2900 | 50 | 30 | -20 |
| 1972-73 | 2900 | 50 | 20 | -30 |
| 1973-74 | 2900 | 50 | 30 | -20 |
| 1974-75 | 2900 | 70 | 30 | 60 |
| 1975-76 | 3000 | 70 | 20 | 50 |
| 1976-77 | 3100 | 60 | 30 | 70 |
| 1977-78 | 3200 | 70 | 20 | 50 |
| 1978-79 | 3300 | 90 | 30 | 40 |
| 1979-80 | 3400 | 100 | 40 | 40 |
| 1980-81 | 3500 | 70 | 40 | 70 |
| 1981-82 | 3600 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Southeast Fairbanks

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 4300 | 110 | 20 | 610 |
| 1970-71 | 5000 | 140 | 10 | 70 |
| 1971-72 | 5200 | 110 | 20 | 10 |
| 1972-73 | 5300 | 100 | 20 | -80 |
| 1973-74 | 5300 | 110 | 10 | 0 |
| 1974-75 | 5400 | 100 | 20 | 20 |
| 1975-76 | 5500 | 120 | 20 | 0 |
| 1976-77 | 5600 | 130 | 20 | -10 |
| 1977-78 | 5700 | 100 | 20 | 20 |
| 1978-79 | 5800 | 140 | 30 | -10 |
| 1979-80 | 5900 | 150 | 10 | -40 |
| 1980-81 | 6000 | 140 | 30 | -10 |
| 1981-82 | 6100 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Valdez-Cordova

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 5000 | 100 | 20 | 120 |
| 1970-71 | 5200 | 100 | 40 | 40 |
| 1971-72 | 5300 | 100 | 40 | 40 |
| 1972-73 | 5400 | 80 | 40 | 60 |
| 1973-74 | 5500 | 70 | 20 | 2450 |
| 1974-75 | 8000 | 100 | 30 | 830 |
| 1975-76 | 8900 | 160 | 40 | -520 |
| 1976-77 | 8500 | 180 | 60 | 80 |
| 1977-78 | 8700 | 160 | 40 | 80 |
| 1978-79 | 8900 | 120 | 30 | 110 |
| 1979-80 | 9100 | 140 | 30 | 90 |
| 1980-81 | 9300 | 190 | 60 | 70 |
| 1981-82 | 9500 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Wade Hampton

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 4000 | 110 | 10 | -100 |
| 1970-71 | 4000 | 110 | 20 | -90 |
| 1971-72 | 4000 | 110 | 30 | 20 |
| 1972-73 | 4100 | 110 | 20 | 10 |
| 1973-74 | 4200 | 120 | 20 | 0 |
| 1974-75 | 4300 | 120 | 20 | 0 |
| 1975-76 | 4400 | 120 | 20 | 0 |
| 1976-77 | 4500 | 130 | 30 | -100 |
| 1977-78 | 4500 | 130 | 20 | -10 |
| 1978-79 | 4600 | 120 | 30 | 10 |
| 1979-80 | 4700 | 140 | 30 | -10 |
| 1980-81 | 4800 | 120 | 30 | -90 |
| 1981-82 | 4900 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Wrangell-Petersburg

| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 5000 | 100 | 40 | -60 |
| 1970-71 | 5000 | 130 | 50 | 20 |
| 1971-72 | 5100 | 120 | 50 | 30 |
| 1972-73 | 5200 | 100 | 50 | 50 |
| 1973-74 | 5300 | 110 | 40 | 30 |
| 1974-75 | 5400 | 100 | 30 | 30 |
| 1975-76 | 5500 | 130 | 40 | 110 |
| 1976-77 | 5700 | 100 | 30 | 130 |
| 1977-78 | 5900 | 120 | 40 | 120 |
| 1978-79 | 6100 | 110 | 40 | 130 |
| 1979-80 | 6300 | 120 | 40 | 120 |
| 1980-81 | 6500 | 120 | 40 | 120 |
| 1981-82 | 6700 | - | - | - |

Table II.4 (continued)

Components of Population Change for Boroughs and Census Areas In Alaska, Each Year: 1970 to 1982

Yukon-Koyukuk

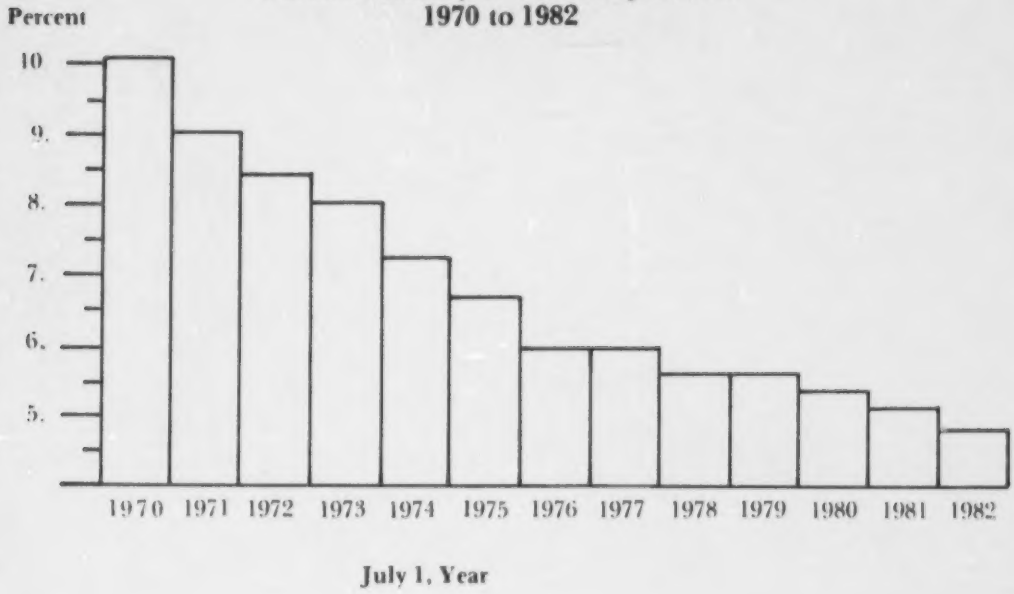
| July 2 to July 1 | Population at end of Period | Components of Change | | |
|---|---|---|---|---|
| | | Births | Deaths | Net Migrants |
| 1969-70 | 7100 | 130 | 50 | -80 |
| 1970-71 | 7100 | 150 | 50 | -100 |
| 1971-72 | 7100 | 130 | 50 | 20 |
| 1972-73 | 7200 | 110 | 50 | 40 |
| 1973-74 | 7300 | 160 | 60 | 0 |
| 1974-75 | 7400 | 150 | 70 | 20 |
| 1975-76 | 7500 | 160 | 60 | 0 |
| 1976-77 | 7600 | 170 | 40 | -130 |
| 1977-78 | 7600 | 180 | 50 | -130 |
| 1978-79 | 7600 | 190 | 60 | -30 |
| 1979-80 | 7700 | 200 | 60 | -40 |
| 1980-81 | 7800 | 180 | 50 | -30 |
| 1981-82 | 7900 | - | - | - |

TABLE II.5

Active Duty Military Personnel
For Boroughs and Census Areas In Alaska,
Each Year: 1970 to 1982

| 1980 Census Area | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aleutian Islands | 3689 | 3592 | 3245 | 2877 | 2983 | 2856 | 2969 | 2790 | 2255 | 2175 | 2213 | 2242 | 2218 |
| Anchorage | 13684 | 13580 | 14177 | 13842 | 12581 | 12486 | 12018 | 11948 | 11716 | 11862 | 11299 | 10833 | 10955 |
| Bethel | 222 | 235 | 190 | 245 | 265 | 253 | 236 | 212 | 42 | 43 | 42 | 47 | 43 |
| Bristol Bay Borough | 439 | 420 | 400 | 440 | 517 | 456 | 452 | 459 | 310 | 369 | 329 | 351 | 344 |
| Dillingham | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fairbanks North Star | 8178 | 7542 | 6305 | 5889 | 5540 | 5445 | 5011 | 5472 | 5374 | 5580 | 5481 | 5529 | 5133 |
| Haines | 30 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Juneau | 205 | 203 | 203 | 203 | 203 | 262 | 271 | 288 | 284 | 275 | 293 | 357 | 292 |
| Kenai Peninsula | 575 | 436 | 106 | 68 | 68 | 75 | 68 | 71 | 52 | 70 | 67 | 68 | 68 |
| Ketchikan Gateway | 334 | 185 | 185 | 185 | 185 | 192 | 194 | 187 | 205 | 188 | 203 | 204 | 215 |
| Kobuk | 105 | 98 | 100 | 110 | 102 | 90 | 88 | 78 | 16 | 17 | 17 | 18 | 17 |
| Kodiak Island | 1491 | 1294 | 682 | 680 | 682 | 877 | 866 | 976 | 897 | 892 | 1098 | 1073 | 1010 |
| Matanuska-Susitna | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 147 | 158 | 147 | 0 | 0 | 0 |
| Nome | 151 | 139 | 132 | 137 | 155 | 150 | 144 | 120 | 42 | 41 | 41 | 43 | 44 |
| North Slope | 108 | 107 | 99 | 100 | 119 | 104 | 109 | 95 | 19 | 17 | 17 | 18 | 20 |
| Outer Ketchikan-Prince of Wales | 0 | 117 | 117 | 117 | 117 | 101 | 111 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sitka | 137 | 53 | 53 | 53 | 53 | 78 | 66 | 216 | 183 | 193 | 174 | 177 | 193 |
| Skagway-Yakutat-Angoon | 0 | 25 | 25 | 21 | 23 | 21 | 16 | 18 | 31 | 15 | 0 | 0 | 0 |
| Southeast Fairbanks | 853 | 765 | 800 | 860 | 689 | 682 | 761 | 793 | 797 | 849 | 801 | 810 | 780 |
| Valdez-Cordova | 38 | 61 | 61 | 61 | 61 | 59 | 53 | 61 | 99 | 96 | 103 | 103 | 87 |
| Wade Hampton | 169 | 94 | 100 | 110 | 102 | 102 | 107 | 87 | 15 | 13 | 12 | 17 | 15 |
| Wrangell-Petersburg | 51 | 23 | 23 | 23 | 23 | 15 | 18 | 22 | 14 | 14 | 20 | 21 | 22 |
| Yukon-Koyukuk | 960 | 946 | 900 | 1025 | 1061 | 968 | 981 | 944 | 592 | 467 | 497 | 540 | 647 |
| TOTAL | 31425 | 29919 | 27907 | 27046 | 25529 | 25272 | 24539 | 24984 | 23101 | 23323 | 22707 | 22451 | 22103 |

**Exhibit II.2**
**Percent Military of Total Population**
**1970 to 1982**



# III. A POPULATION FORECASTING SYSTEM FOR 1982 TO 2002

# III. A POPULATION FORECASTING SYSTEM FOR 1982 TO 2002

## Introduction

In Alaska, as in other states, there are many planning, budget, and marketing activities that require long range population forecasts. Unlike other states, however, Alaska's combination of a small population and volatile migration potential creates a forecasting environment subject to a high degree of uncertainty. Coping with the inherent difficulty of this uncertain forecasting environment is very frustrating for both the producers and consumers of information on Alaska's future population. A major issue in long range forecasting involves the assumptions someone may have about the future. One person, for example, may believe that the gas pipeline will be built while another believes that it won't. Obviously, the choice made between these two options will have a substantial impact on the forecasted population of Alaska but it is very difficult for many people to decide whether or not the gas pipeline will be a reality.

Assumptions play a crucial role in forecasting and it is often difficult to determine their validity. Rather than attempting to impose a single set of assumptions by providing our own forecast, this section of *Alaska Population Overview* presents a set of basic data and the instructions needed to generate resident population forecasts according to someone's own assumptions. This approach to forecasting Alaska's population will allow someone to either turn their own assumptions into a long range forecast or generate alternatives under different assumptions. It is especially designed for someone with little or no technical training in population forecasting. The data and instructions will allow someone with only a pocket calculator to produce a reasonable, understandable forecast of the state's population by age and sex. The basic data forming the components of population change are described below along with appropriate instructions and examples, which show how the data are used.

The shortcomings of this approach to forecasting are several. First, it is tedious to do the calculations. Second, the resolution and numerical accuracy obtained may be less satisfactory than those available from a computerized forecasting system. Third, some of the subtle features of population forecasting are neither obvious nor fully explained; such an explanation could take an entire book.

Even with these shortcomings, however, the benefits appear to be greater. The first is that the many organizations and individuals needing forecasts but lacking the resources to produce them will have access to a low-cost, reasonable forecasting system. With a little practice and appropriate data, someone could, in fact, produce a reasonable population forecast for a borough or census area using this system. Second, the system provides a degree of flexibility that can encompass a wide variety of individual visions about future economic and social conditions in Alaska. This is important. Many people who lack training in population forecasting may have ideas about Alaska's economic and social future that are as appropriate as those generated by someone with the training and experience needed to turn these ideas into a population forecast. The third benefit is that this system clearly exposes the most important ingredient of a forecast: the set of assumptions underlying it. It forces someone using the system to make apparent the set of assumptions used in developing a forecast.

In the following discussion the basic data elements of the forecasting system are explained. The basic elements are: the Baseline Population Projection of the civilian, non-military dependent population, 1982 to 2002, which is found in Table III.1; the set of fertility patterns used for developing the Baseline Population Projection, which is found in Table III.2; a set of four age-specific net migration patterns for each sex that is associated with positive net migration, which is found in Table III.3; a set of four age-specific net migration patterns for each sex that is associated with negative net migration, which is found in Table III.4; an age-sex distribution of the active duty military, found in Table III.5; an age-sex distribution of the dependent population associated with the military, found in Table III.6; and sex-specific "life tables" for Alaska, found in a special report in Section IV. In addition, Tables III.7, III.8, and III.9 provide current estimates by age and sex of the total, civilian, and civilian non-military dependent populations, respectively. A schematic "flow chart" for using the Forecasting System is displayed as Exhibit III.1.

Along with the basic data elements are examples showing how to use each of the elements in order to develop a forecast. The examples are not meant to show an actual forecast. They simply demonstrate how someone can turn a set of assumptions into a forecast using this system.

At the end of this section, a short annotated bibliography is provided for those interested in gaining a greater understanding of the methods and data found in demographic forecasting as well as the role played by assumptions.

A. Baseline Population Projection: 1982 to 2002

Table III.1 contains the projected numbers of civilian, non-military dependent persons by age and sex to the year 2002. This projection is termed "baseline" because in it there is zero migration. That is, no one enters the state and no one leaves the state. The current civilian, non-military dependent population in the state is simply projected into the future using the expected fertility described in Table III.2 and the mortality described in the life table for 1980 found in Section IV. This projection is the basic building block for turning one's assumptions into an alternative forecast. The forecast is given in five year intervals, 1982, 1987, 1992, 1997, and 2002. Each five year interval is called a projection cycle. With the baseline, one can use the tables described below to develop changes in the baseline projection using assumptions concerning migration, the military, and military dependents.

B. Basic Net Migration Patterns

There are three issues concerning net migration. The first is its direction: if it is *positive* then there are more people coming into the state than people leaving it; if it is *negative* then more people are leaving the state than coming into it. The second issue is the volume of net migration. If it is positive, how *many* more people entered the state than left it? If it is negative, how *many* more people went out of the state than entered? The third issue is the age-sex pattern of net migration. Overall, total net migration may be positive but within certain age-groups it may be negative. Different patterns tend to be associated with different areas. Alaska, for example, has a pattern in which net migration is positive for young age-groups and negative for older age groups even when the total volume of net migration is positive. New Mexico, on the other hand, has the opposite pattern: more young people leave New Mexico than enter it; while more older people enter New Mexico than leave it.

As an example of using the three components of migration, suppose that someone assumes that the gas pipeline will be constructed in Alaska between now and 1987. This person would probably expect to see an overall net migration that was positive between now and 1987. Further suppose that this person believes that the volume will be roughly equivalent to what the state experienced during the oil pipeline era, 1972 to 1977, or about 60,000 persons. This means that between 1982 and 1987, one expects that 60,000 more people will enter Alaska than will depart. Now, there is only one issue remaining: what age-sex pattern of net migration should be chosen in order to have a projected civilian, non-military population for 1987 that reflects a reasonable distribution of people by age and sex? To answer this question, one must turn to Table III.3 and the following discussion.

1. Positive Net Migration Patterns.

Table III.3 displays four age-sex related patterns of positive net migration for the civilian, non-military dependent population. Pattern "A" is characteristic of Alaska both currently and in the recent past. It shows a high volume of positive net migration for age group 20-24 (males 1.5295 and females .3669) and a consistent negative net migration for older age-groups. As one moves from "A" to "D" in Table III.3, the migration patterns move away from one associated with a frontier area (pattern "A") toward one that is characteristic of an older, more established state (pattern "D"). Patterns "B" and "C" represent the

transitional phases: "B" is more like "A" than it is like "D"; while "C" is more like "D" than it is like "A".

Continuing our example where someone had decided that the volume of positive net migration between 1982 and 1987 would be 60,000 people but needed to select an age-sex pattern: The same person may now decide that "B" represents the appropriate pattern since it reflects a somewhat more established state than the Alaska of 1972-1977. This person now needs to modify the baseline age-sex distribution for 1987 so that it represents the following:

1. Net Migration is *Positive*

2. The volume of Net Migration is *60,000 persons.*

3. The age-sex pattern of Net Migration is represented by *Pattern "B".*

The first step in turning the three preceding assumptions into a forecasted population for 1987 is to multiply the "proportion women" figure at the bottom of Table III.3 for Pattern "B" to find the expected number of total women: 60,000 x .4670 = 28,020. Subtracting the number of women from 60,000 will give the expected number of total males: 60,000 - 28,020 = 31,980.

The second step is to multiply the value found at each age group for males by the expected number of total males. The same step is repeated for females: multiply the value in Table III.3, Pattern "B", found at each age group for females by the expected number of total females. The results should look like this:

| Age | Pattern B Males | x | Total Male Net Migrants | = | Expected Number of Male Net Migrants By Age | Pattern B Females | x | Total Female Net Migrants | = | Expected Number of Female Net Migrants By Age |
|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 years | .0875 | | 31980 | | 2798 | .0781 | | 28020 | | 2188 |
| 5-9 years | .1351 | | " | | 4320 | .1195 | | " | | 3348 |
| 10-14 years | .1217 | | " | | 3892 | .1016 | | " | | 2847 |
| 15-19 years | .0614 | | " | | 1964 | -.0600 | | " | | -1681 |
| 20-24 years | .6400 | | " | | 20467 | .3204 | | " | | 8978 |
| 25-29 years | .2521 | | " | | 8062 | .5084 | | " | | 14245 |
| 30-34 years | .0120 | | " | | 384 | .1195 | | " | | 3348 |
| 35-39 years | .0872 | | " | | 2789 | .1099 | | " | | 3079 |
| 40-44 years | -.0792 | | " | | -2533 | -.0345 | | " | | - 967 |
| 45-49 years | -.0611 | | " | | -1954 | -.0551 | | " | | -1544 |
| 50-54 years | -.0477 | | " | | -1525 | -.0335 | | " | | - 939 |
| 55-59 years | -.0462 | | " | | -1477 | -.0468 | | " | | -1311 |
| 60-64 years | -.0324 | | " | | -1036 | -.0401 | | " | | -1124 |
| 65-69 years | -.0603 | | " | | -1928 | -.0366 | | " | | -1026 |
| 70-74 years | -.0473 | | " | | -1513 | -.0234 | | " | | - 656 |
| 75 years and over | -.0228 | | " | | - 729 | -.0274 | | " | | - 768 |
| Total net migrants by sex | | | | | 31981 | | | | | 28017 |

The estimated number of net migrants for each age group by sex is, depending on its sign, either added to—or subtracted from—the number in each age-sex group for 1987 found in Table III.1. The final results, which should look like the following, give the projected civilian, non-military dependent population for 1987 given the assumptions concerning migration.

MALES

| Age | Baseline Population | Estimated Number of Net Migrants | Projected Population, Given Migration Assumptions |
|---|---|---|---|
| 0-4 years | 18418 | 2798 | 21216 |
| 5-9 years | 18841 | 4320 | 23161 |
| 10-14 years | 14975 | 3892 | 18867 |
| 15-19 years | 17423 | 1964 | 19387 |
| 20-24 years | 19192 | 20467 | 39659 |
| 25-29 years | 18737 | 8062 | 26799 |
| 30-34 years | 23534 | 384 | 23918 |
| 35-39 years | 23789 | 2789 | 26578 |
| 40-44 years | 18474 | - 2533 | 15941 |
| 45-49 years | 13193 | - 1954 | 11239 |
| 50-54 years | 10697 | - 1525 | 9172 |
| 55-59 years | 8916 | - 1477 | 7439 |
| 60-64 years | 6851 | - 1036 | 5815 |
| 65-69 years | 4551 | - 1928 | 2623 |
| 70-74 years | 2468 | - 1513 | 955 |
| 75 years and over | 1998 | - 729 | 1269 |
| Total | 222057 | 31981 | 254038 |

FEMALES

| Age | Baseline Population | Estimated Number of Net Migrants | Projected Population Given Migration Assumptions |
|---|---|---|---|
| 0-4 years | 17183 | 2188 | 19371 |
| 5-9 years | 17668 | 3348 | 21016 |
| 10-14 years | 14453 | 2847 | 17300 |
| 15-19 years | 16231 | - 1681 | 14550 |
| 20-24 years | 18484 | 8978 | 27461 |
| 25-29 years | 20774 | 14245 | 35019 |
| 30-34 years | 23623 | 3348 | 26971 |
| 35-39 years | 19724 | 3079 | 22803 |
| 40-44 years | 16452 | - 967 | 15485 |
| 45-49 years | 11738 | - 1544 | 10194 |
| 50-54 years | 9352 | - 939 | 8413 |
| 55-59 years | 7621 | - 1311 | 6310 |
| 60-64 years | 6649 | - 1124 | 5525 |
| 65-69 years | 4623 | - 1026 | 3597 |
| 70-74 years | 2822 | - 656 | 2166 |
| 75 years and over | 2873 | - 768 | 2105 |
| Total | 210270 | 28017 | 238287 |

The final civilian, non-military dependent population for 1987 resulting from this positive migration scenario is:

| Age | Total | Males | Females |
|---|---|---|---|
| 0-4 years | 40587 | 21216 | 19371 |
| 5-9 years | 44177 | 23161 | 21016 |
| 10-14 years | 36167 | 18867 | 17300 |
| 15-19 years | 33937 | 19387 | 14550 |
| 20-24 years | 67121 | 39659 | 27462 |
| 25-29 years | 61818 | 26799 | 35019 |
| 30-34 years | 50889 | 23918 | 26971 |
| 35-39 years | 49381 | 26578 | 22803 |
| 40-44 years | 31426 | 15941 | 15485 |
| 45-49 years | 21433 | 11239 | 10194 |
| 50-54 years | 17585 | 9172 | 8413 |
| 55-59 years | 13749 | 7439 | 6310 |
| 60-64 years | 11340 | 5815 | 5525 |
| 64-69 years | 6220 | 2623 | 3597 |
| 70-74 years | 3121 | 955 | 2166 |
| 75 years and over | 3374 | 1269 | 2105 |
| Total | 492325 | 254038 | 238287 |

2. Negative Net Migration Patterns

Table III.4 displays four age-sex related patterns of negative net migration for the civilian, non-military dependent population. In this table, as in Table III.3, moving from Pattern "A" to Pattern "D" leads from a migration pattern associated with a frontier area ("A") to a pattern that is characteristic of an older, more established state ("D"). Patterns "B" and "C" represent transitional phases.

Table III.4 is used in the same way as Table III.3. The difference, of course, is that the patterns found in Table III.4 relate to *negative* net migration. Suppose someone assumes that between 1982 and 1987 there would be a total negative net migration of 15,000 people (15,000 more people left the state then entered it), and that the age-sex pattern would be like that found in "A" of Table III.4. By looking at the bottom of "A", one finds that 44.2% of the total negative net migrants are expected to be female: (15,000)(.442) = 6300. This means that 8,700 are expected to be males since 15,000 - 6,300 = 8,700. From here, the same procedure is used that was shown above in the example for positive net migration. Simply multiply, for example, 6,300 by the value given for each age group under the "female" column for Pattern "A" to get the estimated net female migrants (civilian, non-military dependent) by age. By using the "sign," (that is, whether the number of net migrants for each age group is negative (-) or positive (+) simply adding the number of net migrants to the baseline population will give the projected civilian non-military dependent population by age and sex.

C. Active Duty Military and Their Dependents

Until now, the projection system has been illustrated only for the civilian, non-military dependent population. However, not considering the military and the dependents associated with it would be unrealistic for Alaska. Currently, there are about 22,100 active duty military in the state and an estimated 32,450 dependents. Together, these two groups comprise about 11.8 percent of Alaska's total population. However, while these two groups can not be ignored, they should not be dealt with in the same manner as the remainder of Alaska's population. In the jargon of population forecasting, both the military and their dependents are termed a "special population."

There are two important issues in dealing with this special population. The first is that it is largely insulated from the economic and social conditions affecting Alaska's net migration flows. The second is that this special population should not be "survived" into the future; doing so would generate an aging process over time that simply does not occur for this special population in Alaska.

The way that the military and dependent populations are dealt with here is to simply add them in at the cycle in a forecast for which total population data are desired. A person can assume a given level of military strength for, say, 1987 and use information given in Table III.5 to estimate the age-sex composition of the military and add these people to the appropriate age-sex groups forecasted for the civilian non-military dependent population in 1987. Similarly, the number of dependents, by age and sex, associated with a given level of military strength can be estimated using information in Table III.6. The resulting numbers are added to the appropriate age-sex groups forecasted for the civilian, non-military dependent and military populations to get a final, forecasted total population by age and sex.

1. An Age-Sex Pattern of Active Duty Military

As mentioned above, Table III.5 shows the proportional distribution of the current active duty military in Alaska, while it may be the case that the "real" distribution could change in the future, the information in Table III.5 should be reasonably accurate. The most likely aspect to change is that the proportion of total military that is female may become larger in the future.

The information in Table III.5 is used in the same manner described for net migration patterns. As an example, suppose someone assumes that the total number of active duty military in 1987 will be the same as the number in 1982, which is 22,103. Multiplying this number by the figure given at the bottom of Table III.5 (.9330) gives the estimated number of males. Carrying out the multiplication (.9330 x 22,103), results in an estimated 20,622 males. Subtracting the number of males from the total military gives the number of females: 22,103 - 20,622 = 1,481. To get the number of males by age, 20,622 is multiplied by each of the age-group proportions for males found in Table III.5. Similar calculations are made for the estimated number of females, 1481, using the age-group proportions for females.

The results of this example should look like the following:

| Age | Total Military | Males in the Military | Females in the Military |
|---|---|---|---|
| 0-4 years | 0 | 0 | 0 |
| 5-9 years | 0 | 0 | 0 |
| 10-14 years | 0 | 0 | 0 |
| 15-19 years | 1437 | 1355 | 82 |
| 20-24 years | 10615 | 10153 | 462 |
| 25-29 years | 3292 | 3032 | 260 |
| 30-34 years | 2410 | 2186 | 224 |
| 35-39 years | 2347 | 2155 | 192 |
| 40-44 years | 1073 | 908 | 165 |
| 45-49 years | 457 | 418 | 39 |
| 50-54 years | 328 | 293 | 35 |
| 55-59 years | 102 | 89 | 13 |
| 60-64 years | 42 | 33 | 9 |
| 65-69 years | 0 | 0 | 0 |
| 70-74 years | 0 | 0 | 0 |
| 75 years and over | 0 | 0 | 0 |
| Total | 22103 | 20622 | 1481 |

The preceding figures could now be added to one of the "migration scenario" forecasts for 1987 in the same way that a given scenario's forecasted number of migrants by age and sex is added to the 1987 baseline population.

2. An Age-Sex Pattern of Military Dependents

Table III.6 displays information that can be used to generate the number of military dependents by age and sex once a figure for the total military is assumed. As with the information for total military, the data in Table III.6 should be reasonably accurate. However, an aspect that could change is related to the total number of females in the military. If more females are in the military, many of the spouses associated with them would be military dependents which would increase the number of male dependents in the age groups associated with marriage.

As in the preceding examples, the information in Table III.6 is used to estimate the number of dependents in each age-sex group in order to add these people to a baseline projection modified already by a selected migration scenario and assumed military strength.

The first step in using Table III.6 is to multiply the dependent ratios for each sex (found at the bottom of the table) by the total military. This multiplication gives the estimated total number of dependents for each sex. As an example, suppose the assumed military figure is 22,103. Multiplying 22,103 by .5037 results in the estimated number of male dependents associated with 22,103 military personnel (11,133); multiplying 22,103 by .9643 gives the estimated number of female dependents associated with 22,103 military personnel (21,314). Once the total dependents for each sex are found, the proportion found in Table III.6 in each age group is multiplied by the total for each sex to obtain the estimated number in each age group by sex.

The results, using this example, should look like the following:

| Age | Total Dependents | Dependent Males | Dependent Females |
|---|---|---|---|
| 0-4 years | 8141 | 4111 | 4030 |
| 5-9 years | 7109 | 3748 | 3361 |
| 10-14 years | 4312 | 2112 | 2200 |
| 15-19 years | 1812 | 898 | 914 |
| 20-24 years | 1989 | 0 | 1989 |
| 25-29 years | 3080 | 0 | 3080 |
| 30-34 years | 2377 | 0 | 2377 |
| 35-39 years | 1460 | 0 | 1460 |
| 40-44 years | 880 | 0 | 880 |
| 45-49 years | 492 | 0 | 492 |
| 50-54 years | 211 | 0 | 211 |
| 55-59 years | 229 | 122 | 107 |
| 60-64 years | 265 | 88 | 177 |
| 65-69 years | 87 | 53 | 34 |
| 70-74 years | 0 | 0 | 0 |
| 75 years and over | 0 | 0 | 0 |
| Total | 32444* | 11132* | 21312* |

* These figures vary slightly from the original figures because of rounding.

D. An example Forecast For 1987

By putting together a migration scenario, assumed military strength, and the estimated number of dependents associated with the military, an example forecast for the total population in 1987 can be generated. Suppose the assumed migration scenario is the one used earlier for 60,000 net migrants following pattern "B" found in Table III.3 for positive net migration. Added to this scenario will be the examples used earlier for the military and their dependents. The result should look like the following:

MALES

| Age | Total | = Baseline | + Net Migrants | + Military | + Dependents |
|---|---|---|---|---|---|
| 0-4 years | 25327 | 18418 | 2798 | 0 | 4111 |
| 5-9 years | 26909 | 18841 | 4320 | 0 | 3748 |
| 10-14 years | 20979 | 14975 | 3892 | 0 | 2112 |
| 15-19 years | 21640 | 17423 | 1964 | 1355 | 898 |
| 20-24 years | 49812 | 19192 | 20467 | 10153 | 0 |
| 25-29 years | 29831 | 18737 | 8062 | 3032 | 0 |
| 30-34 years | 26104 | 23534 | 384 | 7186 | 0 |
| 35-39 years | 28733 | 23789 | 2789 | 2155 | 0 |
| 40-44 years | 16849 | 18474 | -2533 | 908 | 0 |
| 45-49 years | 11657 | 13193 | -1954 | 418 | 0 |
| 50-54 years | 9465 | 10697 | -1525 | 293 | 0 |
| 55-59 years | 7650 | 8916 | -1477 | 89 | 122 |
| 60-64 years | 5936 | 6851 | -1036 | 33 | 88 |
| 65-69 years | 2676 | 4551 | -1928 | 0 | 53 |
| 70-74 years | 955 | 2468 | -1513 | 0 | 0 |
| 75 years and over | 1269 | 1998 | - 729 | 0 | 0 |
| Total | 285792 | 222057 | 31981 | 20622 | 11132 |

FEMALES

| Age | Total | = Baseline | + Net Migrants | + Military | + Dependents |
|---|---|---|---|---|---|
| 0-4 years | 23401 | 17183 | 2188 | 0 | 4030 |
| 5-9 years | 24377 | 17668 | 3348 | 0 | 3361 |
| 10-14 years | 19500 | 14453 | 2847 | 0 | 2200 |
| 15-19 years | 15546 | 16231 | -1681 | 82 | 914 |
| 20-24 years | 29913 | 18484 | 8978 | 462 | 1989 |
| 25-29 years | 38359 | 20774 | 14245 | 260 | 3080 |
| 30-34 years | 29572 | 23623 | 3348 | 224 | 2377 |
| 35-39 years | 24455 | 19724 | 3079 | 192 | 1460 |
| 40-44 years | 16530 | 16452 | - 967 | 165 | 880 |
| 45-49 years | 10725 | 11738 | -1544 | 39 | 492 |
| 50-54 years | 8659 | 9352 | - 939 | 35 | 211 |
| 55-59 years | 6430 | 7621 | -1311 | 13 | 107 |
| 60-64 years | 5711 | 6649 | -1124 | 9 | 177 |
| 65-69 years | 3631 | 4623 | -1026 | 0 | 34 |
| 70-74 years | 2166 | 2822 | - 656 | 0 | 0 |
| 75 years and over | 2105 | 2873 | - 768 | 0 | 0 |
| Total | 261080 | 210270 | 28017 | 1481 | 21312 |

While this example shows the result of the assumptions and calculations needed for a forecasted population in 1987, two additional—and very important—features must enter into any forecast beyond 1987. The two additional features are the fertility and mortality of net migrants introduced by an assumed migration scenario for subsequent years.

## E. The Mortality and Fertility Effects of Net Migrants

So far, the examples have been deliberately tied to the year 1987. The reason for this was to demonstrate the more simple features of this forecasting system prior to its more complicated aspects. For someone wanting a forecast to any year beyond 1987, the changes in the age-sex composition of the population caused by preceding migration scenarios must be incorporated into the baseline population. While the procedure demonstrated below for doing this is not technically perfect, it does give a reasonable approximation without requiring the use of a computer.

The essential problem that exists once someone wants a forecast beyond 1987 is that the migrants entering the population at an earlier cycle are subject to deaths and births. Suppose, for example, someone assumed that the positive net migration scenario used earlier (60,000 net migrants under Pattern "B" of Table III.3) was in effect between now and 1987. However, this person wants a forecast to the year 1992 to reflect both the migration scenario for 1982-87 and an additional one for 1987-92. Simply using the baseline population for 1992 found in Table III.3 and adding the two migration scenarios to it ignores the mortality and fertility of the earlier set of net migrants. Some of the migrants entering in the 1987 cycle will die before the 1992 cycle is reached; some of the migrants will experience the birth of children before the 1992 cycle is reached. These points, however, do not mean that the baseline populations found in Table III.1 are useless for someone desiring a forecast beyond 1987. On the contrary, Table III.1 provides crucial information that can be used. The procedures described below will demonstrate their use.

### 1. "Surviving" A Population

The baseline populations for each of the forecast cycle years, 1982 to 2002, found in Table III.1 are, remember, not influenced by migration. They only reflect the effects of the assumed patterns of mortality and fertility. One implication of these effects, for example, is that the number of males shown in age-group 20-24 for 1992 is the surviving number of those males who were aged 15-19 in 1987. The actual numbers taken from Table III.1 are 17,162 males aged 20-24 in 1992 and 17,423 males aged 15-19 in 1987. By forming the ratio 17,162/17,423, the estimated probability of males who are 15-19 years in 1987 surviving to 1992 is obtained: 17,162/17,423 = .98502.

This "probability of survivorship" is what is needed to account for the male migrants assumed to enter the age group 15-19 between now and 1987. Remember the positive net migration scenario used earlier as an example? Under this scenario, there were 1,964 "net migrants" added to the baseline figure of 17,423 for males aged 15-19 in 1987. The total civilian, non-military dependent number of males aged 15-19 in 1987

became 1,964 + 17,423 = 19,387. This is the figure that must be "survived" to 1992 if the effects of the migration scenario used for 1982-87 are to be included in a forecast of males aged 20-24 for 1992. Multiplying 19,387 by the survivorship rate given earlier of .98502 does this for males aged 15-19 in 1987. Thus, (19,387 x .98502 =) 19,097 males who were aged 15-19 in 1987 are expected to be alive (and in age group 20-24) five years later in 1992.

The preceding example demonstrates the general procedure that can be used for each age group starting with "0-4 (and surviving it to "5-9") and going up to "65-69" (and surviving it to age group "70-74"). It will survive each of these age groups five years into the future to the succeeding age group. The five-year survivorship value for each of these groups to the succeeding one is given by the appropriate years (1982, 1992, 1997, 2002) given in Table III.1. For example, in order to get a survivorship probablity for males aged 30-34 in 1992 reaching age 35-39 in 1997, the figure of 18,190 (males aged 35-39 in 1997) should be divided by 18,460 (males aged 30-34 in 1992).

There are three age groups that require a different procedure than the one described above. One of these involves a combination of both mortality and fertility while the other two involve only mortality. Before going on to introduce the additional complication of fertility, the two age groups affected only by mortality will be dealt with.

a. Survivorship in the Oldest Age-Groups

There are two age groups for which the procedure just described will not work. They are the age groups "70-74" (surviving to 75 years and over) and "75 years and over" (surviving to 75 years and over"). The reason why the procedure won't work is that "75 years and over" is not a five year age group like "0-4," "5-9," and so on. In the jargon of demography, "75 years and over" is a "terminal, open-ended age group" and its presence affects both the age group "70-74" and "75 years and over." Essentially what needs to be done is to figure out how many people aged "70 years and over" will survive five years and become the group "75 years and over." This is relatively easy.

As an example, suppose, once again, someone has assumed the positive net migration scenario for 1982-87, described earlier, and wants to determine how many females in the two oldest age-groups (70-74 and 75 years and over) can be expected to survive to 1992. The first step is to add together the number of females aged "70-74" and "75 years and over" found in Table III.1 for the baseline population in 1987. These figures are 2,822 and 2,873, respectively. Added together, the number of females "70 years and over" in 1987 is: 2,822 + 2,873 = 5,695. The second step is to divide 5,695 into the number of females aged "75 years and over" in 1992 in order to get a probability of surviving five years for women aged "70 years and over" in 1987. The resulting approximate survivorship probability is 3,798 / 5,695 = .66690. The third step is to add together the two oldest age groups for civilian, non-military dependent females in 1987 resulting from the positive migration scenario. The two figures, 2,166 and 2,105, combine to form 4,271 civilian non-military dependent females aged 70 years and over in 1987. The final step is to multiply 4,271 by the survivorship probability of .66690 to get the expected number of civilian, non-military dependent females who will be 75 years and over in 1992, which is (4,271x.66690=) 2,848.

b. Survivorship and Fertility in the Youngest Age Group

This problem represents the most involved complication in this forecasting system. It involves, using our earlier example of the positive net migration scenario for 1982-87, how many persons will be aged 0-4 in 1992. Notice that anyone aged 0-4 in 1992 was not alive in 1987. Essentially, the problem involves the number of births expected from the impact of net migrants and the survival of these children. Although there are several ways to solve this problem, the one suggested here provides a reasonable approximation and requires a minimum of calculations. What is suggested is to combine the effects of fertility and mortality by using information from Table III.1 in a manner similar to the survivorship procedure described above. The procedure will be explained using the example of forecasting a population for 1992 given a migration scenario for both 1982-87 and 1987-92.

The first part of the procedure's example requires information from the baseline population found in Table III.1 for 1987 and 1992. First, the number of persons aged 0-4 in 1992 is found, which is 32,866. Next, the number of females aged 15-44 in both 1987 and 1992 is averaged. The average is

$$\frac{115,288 + 112,566}{2} = 113,927$$

Third, find the ratio of the number of persons aged 0-4 in 1992 to the average number of females found between 1987 and 1992:

$$\frac{32,866}{113,927} = .28848$$

The second part of the procedure's example takes information resulting from the migration scenarios for 1982-87 and 1987-92. The first step is to find the number of civilian, non-military dependent females aged 15-44 in 1987 resulting from the positive migration scenario used earlier. This figure is 142,290. Although no example migration scenario was shown for the period 1987-92, suppose one had been used that resulted in 150,000 civilian, non-military dependent females aged 15-44 in 1992. Given this figure, the next step is to average the two sets in the same manner that was done earlier for the baseline population. In this case, the average would be

$$\frac{142,290 + 150,000}{2} = 146,145$$

The next step in this example of the procedure is to multiply the ratio of persons aged 0-4 to the average number of women aged 15-44 found for the baseline population by the average number of women aged 15-44 found using the migration scenarios. The result is .28848 x 146,145 = 42,160. This figure gives the expected number of (civilian non-military dependent) persons aged 0-4 in 1992 resulting from the two assumed migration scenarios for 1982-87 and 1987-92. The final step is to separate the total number of 42,160 into males and females. Continuing the example, this would be done using the baseline population found in Table III.1 for 1992, where 17,014 males are shown out of 32,866 total persons aged 0-4. This proportion of males, (17,014 / 32,866=) .51768, is multiplied by 42,160 to get the estimated number of males aged 0-4 in 1992, (42,160 x .51768 =) 21,825. The number of females is (42,160 - 21,825 =) 20,335. These two numbers, 21,825 males and 20,335 females give the forecasted civilian non-military dependent population aged 0-4 in 1992 associated with the impact of the assumed migration scenarios on the baseline population.

F. Some Comments on Population Forecasting

As mentioned in the beginning of this section, the population forecasting system described here is not technically perfect. It sacrifices some precision in order to provide a means of forecasting to the many people lacking the resources needed for a sophisticated computer-based system. Keep in mind that a sophisticated computer system does not automatically generate a good forecast. It simply allows someone an easier means of producing the detailed population data resulting from a set of assumptions, a set of input data, and a method chosen to generate forecasts. What has been described here represents a "method" and a set of "input data." A set of assumptions must be supplied by the user. By going through the examples, someone can see how a set of assumptions can be turned into a forecast using this "method" and the "input data." The system is quite flexible because of the range of migration scenarios it can accommodate. For example, one could use a positive net migration under pattern "B" for the 1982-87 cycle, a negative net migration scenario under pattern "C" for the 1987-92 cycle, a positive scenario under, say, pattern "C" for the 1992-97 cycle, and yet a different scenario for the 1997-2002 cycle. In using the different migration scenarios, the important thing to remember is "surviving" the population associated with each scenario through its cycle and accounting for the births associated with the net migrants. In terms of "survival," the military and their dependents can be ignored until the "horizon" of the forecast is reached. (A forecast horizon is the date in the future for which population data are desired.) Then, at each point in the cycles leading up to the horizon the military and their dependents are simply added to the population figures generated from the baseline and selected migration scenarios.

One advantage of this system is that it can be used to generate a wide range of alternative forecasts. By using different migration scenarios and comparing the results, one may find, for example, that there is very little difference between the alternatives for a particular age-sex group of interest. In this case, one might be able to develop a plausible argument that a forecast for the age-sex group of interest can be generated with a great deal of certainty regardless of the migration scenarios used. On the other hand, if different assumptions about migration produce very different numbers in an age-sex group of interest then it is important to do several things. First, it is important to clearly specify the differences resulting from the alternative assumptions. Second, it may be useful to examine the alternative assumptions more thoroughly in order to select the most realistic. Third, for planning, budgeting, and marketing purposes, the relative "costs" of the alternatives could be calculated - especially the alternative leading to the highest "cost" (or "loss"). In the cases where different costs are associated with the different alternatives, the accuracy of the different alternatives can be "tracked." By checking the performance of different alternatives against current information that will be published in the future issues of *Alaska*

*Population Overview*, assumptions and alternatives could be narrowed down and plans, budgeting, and marketing strategies revised accordingly.

Some additional data that could be useful are found in other sections of this issue of *Alaska Population Overview*. The historical net migration data found in Section II may be particularly useful in trying to develop the total volume of net migration associated with different migration scenarios. This may be particularly useful for someone who wants to produce a population forecast for one of the state's boroughs or census areas. Other data in Section II include the number of persons by sex and selected age groups as well as the military population.

For those interested in gaining more detailed knowledge about both the techniques and sources of data used in population forecasting, the short, annotated bibliography found at the end of this section can provide a good introduction. As with other aspects of the demography of Alaska the staff is available for helping those who want to develop a forecast. The staff members, along with their areas of responsibility and telephone numbers, are identified in the *Preface* to this issue of *Alaska Population Overview*.

Exhibit III.1 Flow Diagram of the Population Forecasting System

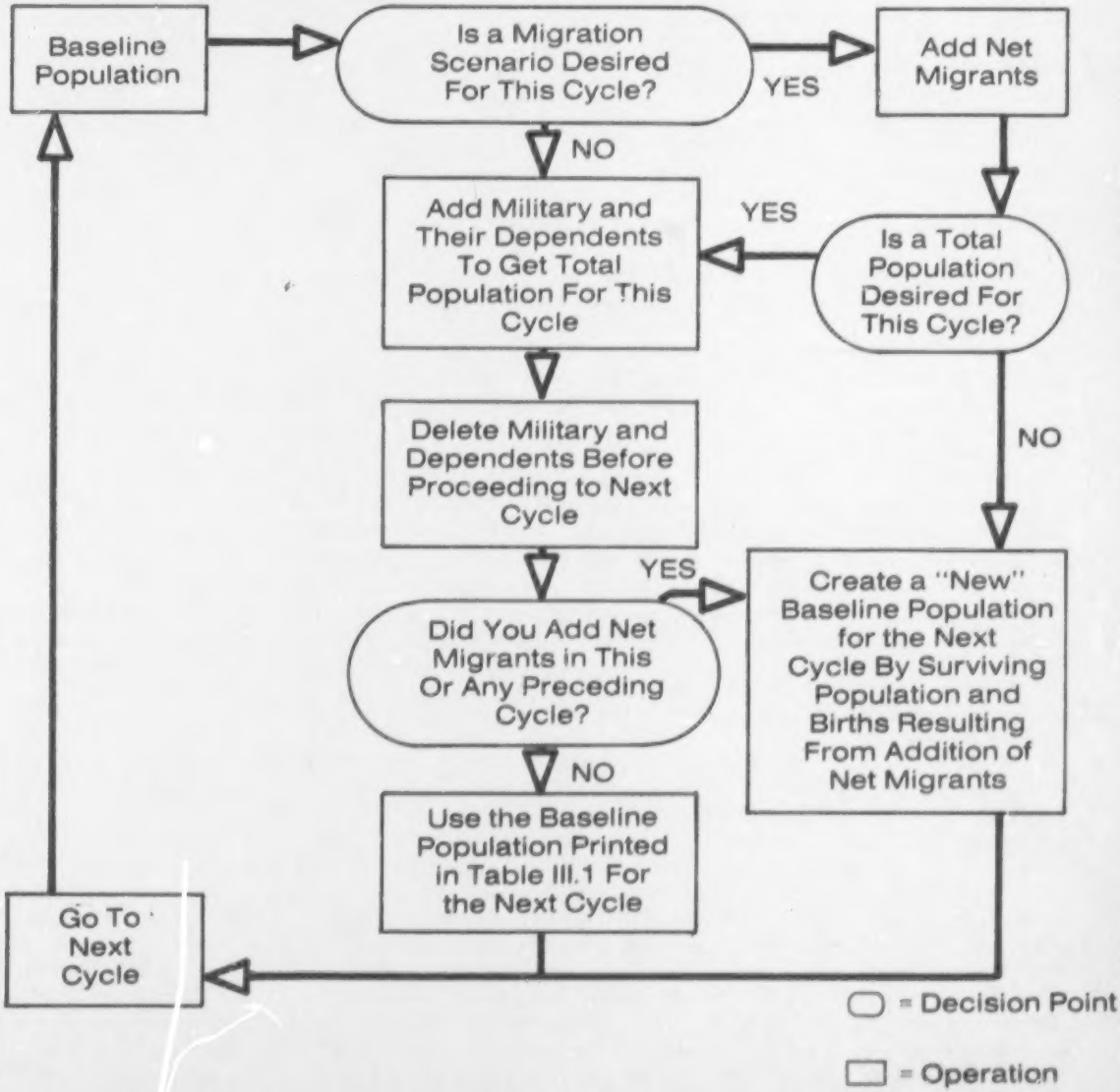

Baseline Population
Is a Migration Scenario Desired For This Cycle?
YES
Add Net Migrants
NO
Add Military and Their Dependents To Get Total Population For This Cycle
YES
Is a Total Population Desired For This Cycle?
Delete Military and Dependents Before Proceeding to Next Cycle
NO
YES
Create a "New" Baseline Population for the Next Cycle By Surviving Population and Births Resulting From Addition of Net Migrants
Did You Add Net Migrants in This Or Any Preceding Cycle?
NO
Use the Baseline Population Printed in Table III.1 For the Next Cycle
Go To Next Cycle
= Decision Point
= Operation

TABLE III.1

Baseline Projection of Alaska's
Civilian Population, Excluding Military
Dependents Under Zero Migration
1982 to 2002

July 1, 1982

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 8991 | 4541 | 4450 |
| 1-4 years | 26950 | 14029 | 12921 |
| 5-9 years | 29462 | 14993 | 14469 |
| 10-14 years | 33945 | 17576 | 16369 |
| 15-19 years | 38066 | 19484 | 18582 |
| 20-24 years | 39883 | 19022 | 20861 |
| 25-29 years | 47626 | 23887 | 23739 |
| 30-34 years | 43984 | 24143 | 19841 |
| 35-39 years | 35456 | 18837 | 16619 |
| 40-44 years | 25334 | 13522 | 11812 |
| 45-49 years | 20610 | 11068 | 9542 |
| 50-54 years | 17282 | 9412 | 7870 |
| 55-59 years | 14440 | 7514 | 6926 |
| 60-64 years | 10318 | 5330 | 4988 |
| 65-69 years | 6222 | 3060 | 3162 |
| 70-74 years | 3821 | 1818 | 2003 |
| 75 years & Over | 3790 | 1652 | 2138 |
| Total | 406180 | 209888 | 196292 |

TABLE III.1 (continued)

Baseline Projection of Alaska's
Civilian Population, Excluding Military
Dependents Under Zero Migration
1982 to 2002

July 1, 1987

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 8661 | 4378 | 4283 |
| 1-4 years | 26940 | 14040 | 12900 |
| 5-9 years | 36509 | 18841 | 17668 |
| 10-14 years | 29428 | 14975 | 14453 |
| 15-19 years | 33654 | 17423 | 16231 |
| 20-24 years | 37676 | 19192 | 18484 |
| 25-29 years | 39511 | 18737 | 20774 |
| 30-34 years | 47157 | 23534 | 23623 |
| 35-39 years | 43513 | 23789 | 19724 |
| 40-44 years | 34926 | 18474 | 16452 |
| 45-49 years | 24931 | 13193 | 11738 |
| 50-54 years | 20049 | 10697 | 9352 |
| 55-59 years | 16537 | 8916 | 7621 |
| 60-64 years | 13500 | 6851 | 6649 |
| 65-69 years | 9174 | 4551 | 4623 |
| 70-74 years | 5290 | 2468 | 2822 |
| 75 Years and Over | 4871 | 1998 | 2873 |
| Total | 432327 | 222057 | 210270 |

TABLE III.1 (continued)

Baseline Projection of Alaska's
Civilian Population, Excluding Military
Dependents Under Zero Migration
1982 to 2002

July 1, 1992

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 7479 | 3782 | 3697 |
| 1-4 years | 25387 | 13232 | 12155 |
| 5-9 years | 36238 | 18713 | 17525 |
| 10-14 years | 36466 | 18818 | 17648 |
| 15-19 years | 29176 | 14845 | 14331 |
| 20-24 years | 33307 | 17162 | 16145 |
| 25-29 years | 37311 | 18904 | 18407 |
| 30-34 years | 39133 | 18460 | 20673 |
| 35-39 years | 46673 | 23189 | 23484 |
| 40-44 years | 42857 | 23331 | 19526 |
| 45-49 years | 34277 | 18024 | 16253 |
| 50-54 years | 24255 | 12751 | 11504 |
| 55-59 years | 19189 | 10133 | 9056 |
| 60-64 years | 15445 | 8129 | 7316 |
| 65-69 years | 12013 | 5850 | 6163 |
| 70-74 years | 7798 | 3671 | 4127 |
| 75 Years and over | 6510 | 2712 | 3798 |
| Total | 453514 | 231706 | 221808 |

TABLE III.1 (continued)

Baseline Projection of Alaska's
Civilian Population, Excluding Military
Dependents Under Zero Migration
1982 to 2002

July 1, 1997

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 6264 | 3170 | 3094 |
| 1-4 years | 21360 | 11144 | 10216 |
| 5-9 years | 33514 | 17325 | 16189 |
| 10-14 years | 36194 | 18689 | 17505 |
| 15-19 years | 36154 | 18655 | 17499 |
| 20-24 years | 28877 | 14622 | 14255 |
| 25-29 years | 32983 | 16905 | 16078 |
| 30-34 years | 36942 | 18625 | 18317 |
| 35-39 years | 38741 | 18190 | 20551 |
| 40-44 years | 45990 | 22742 | 23248 |
| 45-49 years | 42053 | 22763 | 19290 |
| 50-54 years | 33349 | 17420 | 15929 |
| 55-59 years | 23219 | 12079 | 11140 |
| 60-64 years | 17932 | 9238 | 8694 |
| 65-69 years | 13722 | 6941 | 6781 |
| 70-74 years | 10219 | 4718 | 5501 |
| 75 Years and Over | 9557 | 4003 | 5554 |
| Total | 467070 | 237229 | 229841 |

TABLE III.1 (continued)

Baseline Projection of Alaska's
Civilian Population, Excluding Military
Dependents Under Zero Migration
1982 to 2002

July 1, 2002

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 5537 | 2798 | 2739 |
| 1-4 years | 18802 | 9810 | 8992 |
| 5-9 years | 28248 | 14616 | 13632 |
| 10-14 years | 33473 | 17303 | 16170 |
| 15-19 years | 35905 | 18552 | 17353 |
| 20-24 years | 35781 | 18375 | 17406 |
| 25-29 years | 28599 | 14403 | 14196 |
| 30-34 years | 32655 | 16655 | 16000 |
| 35-39 years | 36561 | 18352 | 18209 |
| 40-44 years | 38184 | 17840 | 20344 |
| 45-49 years | 45155 | 22188 | 22967 |
| 50-54 years | 40906 | 22000 | 18906 |
| 55-59 years | 31903 | 16502 | 15401 |
| 60-64 years | 21707 | 11012 | 10695 |
| 65-69 years | 15946 | 7888 | 8058 |
| 70-74 years | 11651 | 5598 | 6053 |
| 75 Years and Over | 11868 | 4679 | 7189 |
| Total | 472881 | 238571 | 234310 |

TABLE III.2

Forecasted Age-specific Civilian Non-Military
Dependent Fertility Rates: 1982 to 2002

| Age of Mother | Births Per 1000 Civilian, Non-Military Dependent Women | | | | |
|---|---|---|---|---|---|
| | 1982 | 1987 | 1992 | 1997 | 2002 |
| 15-19 years | 71.8 | 74.2 | 71.2 | 65.3 | 53.4 |
| 20-24 years | 175.9 | 182.3 | 176.9 | 164.4 | 149.2 |
| 25-29 years | 132.6 | 137.2 | 134.7 | 120.7 | 105.7 |
| 30-34 years | 64.0 | 66.2 | 63.5 | 59.2 | 47.7 |
| 35-39 years | 28.5 | 19.5 | 28.9 | 26.0 | 21.2 |
| 40-44 years | 10.4 | 10.8 | 10.7 | 9.5 | 7.8 |
| 45 years and Over | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Fertility Rate | 2.416 | 2.451 | 2.430 | 2.226 | 1.925 |

TABLE III.3

Positive Net Migration Patterns

| Age at end of Projection Cycle | Type of Migration Pattern | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A | | B | | C | | D | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| 0-4 years | .0657 | .0550 | .0875 | .0781 | .1096 | .0917 | .0570 | .0536 |
| 5-9 years | .1020 | .0946 | .1351 | .1195 | .1391 | .1503 | .1339 | .1328 |
| 10-14 years | .0078 | .0058 | .1217 | .1016 | .1323 | .1292 | .1359 | .1291 |
| 15-19 years | .0820 | -.0616 | .0614 | -.0600 | -.0140 | -.0429 | -.0247 | -.0314 |
| 20-24 years | 1.5095 | .3669 | .6400 | .3204 | .3971 | .2765 | .2613 | .1959 |
| 25-29 years | .3767 | .6447 | .2521 | .5084 | .1697 | .2361 | .1383 | .1614 |
| 30-34 years | -.4285 | .2936 | .0120 | .1195 | .1002 | .1168 | .0651 | .1011 |
| 35-39 years | -.0252 | .0627 | .0872 | .1099 | .1092 | .1055 | .0598 | .0753 |
| 40-44 years | -.0868 | -.0342 | -.0792 | -.0345 | .0292 | .0573 | .0564 | .0636 |
| 45-49 years | -.1222 | -.0838 | -.0611 | -.0551 | .0363 | .0447 | .0587 | .0514 |
| 50-54 years | -.1275 | -.0572 | -.0477 | -.0335 | -.0397 | -.0393 | .0418 | .0323 |
| 55-59 years | -.0868 | -.0747 | -.0462 | -.0468 | -.0327 | -.0297 | .0196 | .0215 |
| 60-64 years | -.1124 | -.0843 | -.0324 | -.0401 | -.0030 | -.0119 | .0071 | .0164 |
| 65-69 years | -.0959 | -.0676 | -.0603 | -.0366 | -.0505 | -.0312 | -.0058 | .0003 |
| 70-74 years | -.0344 | -.0383 | -.0473 | -.0234 | -.0592 | -.0275 | -.0002 | -.0005 |
| 75 years and over | -.0240 | -.0212 | -.0228 | -.0274 | -.0256 | -.0256 | -.0042 | -.0030 |
| Proportion that are female of total net migrants | | .4250 | | .4670 | | .5005 | | .5120 |

TABLE III.4

Negative Net Migration Patterns

| Age at end of Projection Cycle | Type of Migration Pattern | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A | | B | | C | | D | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| 0-4 years | .0219 | .0272 | .0122 | .0165 | -.0074 | -.0055 | -.0355 | -.0331 |
| 5-9 years | .0038 | .0013 | .0010 | -.0007 | -.0975 | -.1023 | -.1091 | -.1025 |
| 10-14 years | -.0203 | -.0326 | -.0370 | -.0479 | -.0950 | -.1169 | -.1195 | -.1201 |
| 15-19 years | -.1364 | -.1646 | -.1578 | -.0974 | -.1306 | -.1119 | -.1175 | -.1108 |
| 20-24 years | .3267 | .1410 | .1317 | .0671 | .0111 | -.0122 | -.2280 | -.1919 |
| 25-29 years | .0843 | .0047 | .0502 | -.0132 | -.0342 | -.0700 | -.1944 | -.1876 |
| 30-34 years | -.5212 | -.2598 | -.3782 | -.2241 | -.2364 | -.1390 | -.0882 | -.0858 |
| 35-39 years | -.1094 | -.0864 | -.1028 | -.0973 | -.0707 | -.0658 | -.0375 | -.0423 |
| 40-44 years | -.0824 | -.0554 | -.0928 | -.0668 | -.0755 | -.0616 | -.0203 | -.0273 |
| 45-49 years | -.0940 | -.1004 | -.0847 | -.0815 | -.0723 | -.0661 | -.0140 | -.0222 |
| 50-54 years | -.0983 | -.0993 | -.0859 | -.0805 | -.0507 | -.0530 | -.0108 | -.0192 |
| 55-59 years | -.0686 | -.0946 | -.0460 | -.0963 | -.0371 | -.0536 | -.0090 | -.0178 |
| 60-64 years | -.1192 | -.0935 | -.0664 | -.0817 | -.0255 | -.0461 | -.0029 | -.0102 |
| 65-69 years | -.0911 | -.0879 | -.0644 | -.0966 | -.0270 | -.0438 | -.0020 | -.0037 |
| 70-74 years | -.0446 | -.0521 | -.0416 | -.0527 | -.0296 | -.0300 | -.0023 | -.0055 |
| 75 years and over | -.0312 | -.0476 | -.0367 | -.0469 | -.0216 | -.0222 | -.0090 | -.0200 |
| Proportion that are female of total net migrants | | .4420 | | .4830 | | .5125 | | .5340 |

TABLE III.5

Proportional Distribution
of Active Duty Military
By Age and Sex

| Age | Proportion of All Males in Age Group | Proportion of All Females in Age Group |
|---|---|---|
| Under 1 year | 0 | 0 |
| 1-4 years | 0 | 0 |
| 5-9 years | 0 | 0 |
| 10-14 years | 0 | 0 |
| 15-19 years | .0657 | .0554 |
| 20-24 years | .4923 | .3120 |
| 25-29 years | .1470 | .1756 |
| 30-34 years | .1060 | .1512 |
| 35-39 years | .1040 | .1296 |
| 40-44 years | .0440 | .1114 |
| 45-49 years | .0203 | .0263 |
| 50-54 years | .0142 | .0236 |
| 55-59 years | .0043 | .0088 |
| 60-64 years | .0016 | .0061 |
| 65-69 years | 0 | 0 |
| 70-74 years | 0 | 0 |
| 75 years and over | 0 | 0 |
| Proportion of total military that are female | .0670 | |

TABLE III.6

Proportional Distribution
of Dependents of
Active Duty Military
By Age and Sex

| Age | Proportion of All Males in Age Group | Proportion of All Females in Age Group |
|---|---|---|
| Under 1 year | .0466 | .0239 |
| 1-4 years | .3226 | .1652 |
| 5-9 years | .3367 | .1577 |
| 10-14 years | .1897 | .1032 |
| 15-19 years | .0807 | .0429 |
| 20-24 years | 0 | .0933 |
| 25-29 years | 0 | .1445 |
| 30-34 years | 0 | .1115 |
| 35-39 years | 0 | .0685 |
| 40-44 years | 0 | .0413 |
| 45-49 years | 0 | .0231 |
| 50-54 years | 0 | .0099 |
| 55-59 years | .0110 | .0050 |
| 60-64 years | .0079 | .0083 |
| 65-69 years | .0048 | .0016 |
| 70-74 years | 0 | 0 |
| 75 years and over | 0 | 0 |
| Ratio of Dependents to Total Military | .5037 | .9643 |

TABLE III.7

Persons by Age and Sex
Alaska, July 1, 1982*

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 10019 | 5060 | 4959 |
| 1-4 years | 34062 | 17620 | 16442 |
| 5-9 years | 36573 | 18742 | 17831 |
| 10-14 years | 38257 | 19688 | 18569 |
| 15-19 years | 41316 | 21737 | 19579 |
| 20-24 years | 52487 | 29175 | 23312 |
| 25-29 years | 53998 | 26919 | 27079 |
| 30-34 years | 48770 | 26329 | 22441 |
| 35-39 years | 39264 | 20992 | 18272 |
| 40-44 years | 27357 | 14430 | 12927 |
| 45-49 years | 21560 | 11486 | 10074 |
| 50-54 years | 17021 | 9705 | 8116 |
| 55-59 years | 14771 | 7726 | 7045 |
| 60-64 years | 10624 | 5451 | 5173 |
| 65-69 years | 6310 | 3113 | 3197 |
| 70-74 years | 3821 | 1818 | 2003 |
| 75 years and over | 3790 | 1652 | 2138 |
| Total | 460800 | 241643 | 21957 |

*The total population figure is rounded.

TABLE III.8

Civilian Persons By Age and Sex
Alaska, July 1, 1982*

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 10019 | 5060 | 4959 |
| 1-4 years | 34062 | 17620 | 16442 |
| 5-9 years | 36573 | 18742 | 17831 |
| 10-14 years | 38257 | 19688 | 18569 |
| 15-19 years | 39879 | 20382 | 19497 |
| 20-24 years | 41872 | 19022 | 22850 |
| 25-29 years | 50706 | 23887 | 26819 |
| 30-34 years | 46360 | 24143 | 22217 |
| 35-39 years | 36917 | 18837 | 18080 |
| 40-44 years | 26284 | 13522 | 12762 |
| 45-49 years | 21103 | 11068 | 10035 |
| 50-54 years | 17493 | 9412 | 8081 |
| 55-59 years | 14669 | 7637 | 7032 |
| 60-64 years | 10582 | 5418 | 5164 |
| 65-69 years | 6310 | 3113 | 3197 |
| 70-74 years | 3821 | 1818 | 2003 |
| 75 year and over | 3790 | 1652 | 2138 |
| Total | 438697 | 221021 | 217676 |

*The total number of civilian persons is derived using a rounded figure of 460,800 for the total population.

TABLE III.9

Civilian Persons, Excluding Military Dependents,
By Age and Sex
Alaska, July 1, 1982*

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 year | 8991 | 4541 | 4450 |
| 1-4 years | 26950 | 14029 | 12921 |
| 5-9 years | 29462 | 14993 | 14469 |
| 10-14 years | 33945 | 17576 | 16369 |
| 15-19 years | 38066 | 19484 | 18582 |
| 20-24 years | 39883 | 19022 | 20861 |
| 25-29 years | 47626 | 23887 | 23739 |
| 30-34 years | 43984 | 24143 | 19841 |
| 35-39 years | 35456 | 18837 | 16619 |
| 40-44 years | 25334 | 13522 | 11862 |
| 45-49 years | 20610 | 11068 | 9542 |
| 50-54 years | 17282 | 9412 | 7870 |
| 55-59 years | 14440 | 7514 | 6926 |
| 60-64 years | 10318 | 5330 | 4988 |
| 65-69 years | 6222 | 3060 | 3162 |
| 70-74 years | 3821 | 1818 | 2003 |
| 75 years and over | 3790 | 1652 | 2138 |
| Total | 406180 | 209888 | 196292 |

*The total number of civilian persons excluding military dependents, is derived using a rounded figure of 460800 for the total population.

## G. ANNOTATED BIBLIOGRAPHY

A. Sources of information on the techniques of Population Forecasting.

1. *Local Population and Employment Projection Techniques* by Michael R. Greenberg et al., published in 1978 by the Center for Urban Policy Research, Rutgers University, New Brunswick, New Jersey.

   This book describes techniques that are typically used by economists to project population. The techniques in the book will not provide age, sex, or race, only total populations. A computer program (in FORTRAN code) is provided along with sample output.

2. *Projecting State and Local Populations* by Donald B. Pittenger, published in 1976 by Ballinger Publishing Company, Cambridge, Massachusetts.

   This book is probably the best single source on the techniques used by both demographers and non-demographers for forecasting. It gives many examples of the techniques and provides a demographic forecasting system that will generate age, sex, and race data. The book is both a good introduction for beginners and a valuable reference for those with training in population forecasting.

3. *Matrix Analysis of Interregional Population Growth and Distribution* by Andrei Rogers, published in 1968 by the University of California Press, Berkeley, California.

   Andrei Rogers has continued the development of the highly technical forecasting system proposed in this book. Many subsequent publications using this system are published by the International Institute for Applied Systems Analysis, A-2361, Laxenburg, Austria. These publications are very difficult for beginners to understand.

B. Sources of Data and Projections

1. *Current Population Reports*, Series P-25, a series published by the U.S. Bureau of the Census.

   Several titles in this series provide national and state level projections of population by age, sex, and race. Recent examples of these are Series P-25, No. 796 and Series P-25, No. 704.

   Many titles in this series provide data that can be used as input for projections. Migration data for states and counties are found in series P-25 No. 701. Fertility, Mortality, and Migration for states can be found in Series P-25, No 796.

2. Decennial Census Publications

   These publications, although appearing only once every ten years, provide the basic age, sex, and race data used to generate population forecasts. Data are typically found in *General Population Characteristics, General Social and Economic Characteristics*, and *Detailed Characteristics*.

3. *The National Center for Health Statistics* publishes annual data on fertility and mortality for each state in two separate volumes under its vital statistics series. Vital Statistics for Alaska are also published by the state's *Department of Health and Social Services*.

4. *The Institute for Social and Economic Research, University of Alaska* has an econometric modelling system that can generate population projections for Alaska and selected sub-areas of the state. At the time of this publication another econometric modelling system capable of generating population projections for Alaska is under the auspices of the *Governor's Office of Management and Budget*. An assortment of local area population projections are also filed within the state's *Department of Transportation and Public Facilities, Division of Planning*.

5. Data on the Net Migration of the population by age, sex, and race for states and sub-state areas are available from the following:

   a. *Components of Population Change, 1940-50: Estimates of Net Migration and Natural Increase for each Standard Metropolitan Area and State Economic Area* by Donald J. Bogue, published in 1957 by the University of Chicago.

   b. *Net Migration of the Population, 1950-60: By Age, Sex, and Color. Vol. I States, Counties, Economic Areas, and Metropolitan Areas* by Donald J. Bogue and Calvin L. Beale, published in 1965, by the U. S. Department of Agriculture, Oklahoma State University and the U. S. Department of Commerce (cooperating).

   c. *Net Migration of the Population, 1960-70: By Age, Sex, and Color [Parts 1 through 6]*. By Gladys K. Bowles, Calvin L. Beale, and Everett S. Lee, published in 1975 by the U.S. Department of Agriculture, the University of Georgia, and the National Science Foundation (cooperating).

   These volumes provide richly detailed historical data on the patterns of net migration associated with different areas of the United States. They are very important for developing migration scenarios.

# IV. SPECIAL REPORTS

# IV. SPECIAL REPORTS

## INTRODUCTION

This section contains: the technical documentation for the data presented in Sections I and II; a set of life tables for Alaska; a descriptive report on the results of a census of oil-related worksites in the North Slope Borough; two research reports on methods of population estimation; and a discussion on the availability of 1980 census data. In general, these reports will be of more interest to technical persons than to general users of population information. As an example, one of the research reports is based on data from Washington State, (since equivalent historical data are not yet available for Alaska). It serves as an initial examination of a method that could be tested—and possibly used—in Alaska when we have completed the construction of an adequate data base.

# 1982 POPULATION DETERMINATIONS: TECHNICAL DOCUMENTATION

David Swanson, Alaska Department of Labor

Because of the wide applicability of population data and the potential for rapid change that exists in Alaska, consistent, annual figures are important. The two procedures used to develop resident population information are either a census or an estimation technique. Since a census costs more, most population determinations are developed through estimation. *In order to provide consistency, this issue of Alaska Population Overview does not display data used for state revenue sharing and related programs in 1982.* Uncertainty regarding the definition of population utilized by the state for these programs prompted the need for a publication that maintained a set of population figures consistent with the data resulting from both the 1970 and 1980 Decennial Census of Alaska. However, the figures for 1982 shown in Section I were derived from procedures that were designed to measure a resident population as defined in accordance with the concept of the resident population used for the 1981 distribution of state revenue sharing and related funds. Because of this, the first part of the technical documentation that follows covers the 1982 population determinations made under the definition used in 1981. The second part documents the modifications used to develop the set of resident population figures consistent with the definitions used by the U.S. Bureau of the Census.

*I. Initial Population Determinations Under Regulations in effect through 22 November 1982.*

The first step in developing a set of 1982 comprehensive population determinations for Alaska was an estimate of the state's total population. This figure was then used as a total to which the population estimates of the twenty-three Census Areas were controlled. There are two basic reasons for this approach which is, incidentally, used not only in Alaska but also by demographic centers in every other state and by the U.S. Bureau of the Census. The first reason is that, in general, it has been found that a higher degree of accuracy is achieved using this approach than would be found by developing independent estimates for a state's sub-areas and adding them together to obtain a state total. Second, one of the most consistently accurate methods of population estimation, the ratio-correlation form of multiple regression, requires an independently developed state total population.

The official state total population for July 1, 1982 was estimated using a series of separate techniques designed to capture the components of population change between the date of the last federal census, April 1st, 1980 and the state's official date of July 1st for 1982. The three components of population change are births, deaths, and the net number of migrants. An important factor affecting the net number of migrants is seasonality-Alaska's resident population is typically somewhat higher at a July 1st date than at an April 1st date. The techniques used to develop the July 1st 1982 estimate of the state's total population first brought the revised April 1st, 1980 census total of 402,241 forward to April 1st, 1982.*1*/ The techniques used were the "Bogue-Duncan Composite Method" and a modified "Component Method II".*2*/ The estimates from these two methods were then arithmetically averaged to obtain a preliminary estimate for April 1st, 1982 of 444,516.

Once the preliminary April 1st estimate was developed, an adjustment factor for "seasonality" brought the estimate forward to the July 1st date. This factor, 1.0196, was developed using 1980 and 1981 census data from the six major cities conducting a 1981 census in Alaska.*3*/ Multiplying the April 1st figure of 444,516 by 1.0196 provided a preliminary July 1st, 1982 population total of 453,229. This figure was adjusted to a revised figure of 465,019 to account for 1982 municipal and borough census counts and approved locally-produced municipal estimates, which in some Census Areas indicated that the preliminary estimate was low.

Once the preliminary state total population for July 1st, 1982 was developed, estimates for the state's twenty-three Census Areas were generated. The primary method used was the ratio-correlation procedure.*4*/ Along with the ratio-correlation method, a modified version of Component Method II and the Bogue-Duncan Composite Method were used to develop a set of July 1st, 1982 figures. Using the numbers generated by these techniques, a set of weighted averages was produced. Applied to this set were two additional sets of figures available through locally-produced, approved estimates and census counts. In the Census Areas where a significant proportion of the population was actually counted in an approved census, the Census Area total was "floated" upward if the initial figure was too low relative to the 1982 Census counts. This adjustment was considered only in Census Areas. The other set of figures, resulting from approved estimates generated using the "Housing Unit Method," was available for three boroughs, Anchorage, Juneau, and Matanuska-Susitna.*5*/ For these three Census Areas a weighted average was taken using the estimates developed locally and by the state.

The July 1st, 1982 population of each municipality in the state was determined through one of three methods: (1) a local census conducted under guidelines established by the Department of Community and Regional Affairs and the State Demographer; (2) a Housing Unit Method estimate, reviewed, and where appropriate, adjusted by the State Demographer; and (3) an allocation technique based on the share of population that a given municipality had in its census area as reported in its most recent census. The last method was used only when a municipality neither conducted a census nor provided the data needed for a Housing Unit Method estimate.

*II. Modifications to Initial 1982 Population Determinations needed to maintain consistency with the 1980 Decennial Census of Alaska.*

In November of 1982, the Department of Community and Regional Affairs filed an emergency change in the regulations (19 AAC 30.041) defining population. This change involved counting maintenance and construction workers at the site where they are working when: (1) the site has living accommodations for these workers that are of a "camp" nature; and (2) a worker spends four consecutive nights at the site (including the day of a census) during the week in which a census is conducted. During the 1980 federal census this practice was not used by the U.S. Bureau of the Census in Alaska. Both the Office of the Governor and the Department of Community and Regional Affairs were informed by the U.S. Bureau of the Census that it intended to count a maintenance or construction worker found at work-site camps in Alaska at the place the worker identified as a "usual residence."

In view of changes in the pre-1980 distribution of funds available to local areas caused by the decision made by the U.S. Bureau of the Census to count workers at their usual place of residence, the Department of Community and Regional Affairs requested an opinion from the Alaska Department of Law on the definition of population. Subsequent to the opinion, the Department of Community and Regional Affairs developed regulatory language that was used for the 1981 set of population determinations. These regulations represented a "middle ground" between counting all maintenance and construction workers at a site, on the one hand, and not counting any. The regulations were used for counting persons at the place where they spent the majority of their time, whether that place was a worksite or a "usual residence." Subsequent to the 1981 round of population determinations, it was still not clear if the Department of Community and Regional Affairs had instituted a definition of population that conformed to the opinion written by the Department of Law. The opinion was used as a basis for further changing the definition of population which is found in the regulations filed in November of 1982. However, these regulations were challenged in court by four of the state's boroughs. The court upheld the challenge and at this time, it is not clear what definition will be used for state revenue-sharing.

In developing the final 1982 population determinations published in Section I, it was apparent that the oil-related worksites in the North Slope Borough would be the primary worksites from which the population initially determined would require allocation back to their "usual places of residence." Data from the results of a special census of oil-related worksites were used for this purpose (a report contained in Section IV displays these data). Work on the estimation of population data by 1980 census area for the period 1970-1982 was also used to develop the final 1982 estimates through an "averaging" procedure using results from a "ratio-correlation" model, a "rate-correlation model," and the data resulting from the reallocation of North Slope workers to their places of residence.6/ This work resulted in a final estimated state total population of 460,837 for July 1, 1982. The revised data giving the components of change between July 1, 1980 and July 1, 1982 are:

| | |
|---|---|
| Revised Population July 1, 1980 | 419,700 |
| + Births | 19,060 |
| - Deaths | 3,350 |
| + Net Migrants | 25,427 |
| = Final Population July 1, 1982 | 460,837 |

Revisions to municipal determinations initially made under the 1981 rule were also made in order to develop estimates of their populations according to the concept of resident population used in the 1980 Decennial Census. Revisions were made to both initial census counts and estimates using an allocation procedure based on a municipality's share of the total population in its Borough or Census Area.

In general, the procedures used to develop these estimates are consistent with those used by the U.S. Bureau of the Census and many of the Demographic Centers found in other states. Using several methods to develop initial estimates and averaging the results to obtain final figures has been consistently found to yield a high degree of accuracy. This approach is recommended by the U.S. Bureau of the Census.

## Footnotes

1. The "revised" state population total for April 1st, 1980 was based upon the regulations in effect for the 1981 population determinations and the results of the special 1981 census of oil-related worksites in the North Slope Borough.

2. The Bogue-Duncan Composite Method variant involved calculating the crude birth, death, and enrollment rates for 1970 and 1980, finding the rate of change, trending the rate to 1982 and dividing it into the number of events (births, deaths, or enrollment) to obtain a 1981 population estimate. The Component Method II approach takes the most recent federal census figure, to which are added reported births and deaths occurring between the date of the most recent federal census and April 1st of the current year, and the estimated net number of migrants, derived using a cohort-survival analysis of school enrollment data fall, 1980 to fall, 1982. The result of the component method estimate of population change April 1st, 1980 to April 1st, 1982, using the 1981 definition of resident population is:

| | |
|---|---|
| 1980 Census total (revised to reflect the definition used in 1981) | 402,241 |
| + Births | 17,724 |
| - Deaths | 3,478 |
| + Net Migrants | 28,029 |
| 1982 estimate | 444,516 |

3. The seasonality factor was produced using the formula described in footnote No. 2, page 66 in the 1981 edition of *Alaska Population Overview*.

4. The ratio-correlation model using data revised in accordance with the definition of resident population used in 1981 exhibited the following characteristics:

$$Rp = .1700056 + (.2284613 * Rvs) + (.5810727 * Re)$$

$$R^2 = .78615$$

$$S.E.E. = .13547$$

Where

Rp = ratio of proportional population (revised to reflect the definition of resident population used in 1981), 1980 over 1970.

Rvs = ratio of proportional vital statistics, 1980 over 1970.

Re = ratio of proportional enrollment 1980 over 1970.

5. The Housing Unit Method is described in detail in *The Housing Unit Method of Population Estimation: A Manual For Municipal Personnel Responsible for Annual Population Estimates.* which is available from the State Demographer, Alaska Department of Labor. The weighting used was .8 for the locally-produced estimate, if it utilized a sample household survey; if it did not it was given a .5 weight.

6. The ratio-correlation model using the 1980 definition of resident population exhibited the following characteristics:

$$Rp = .1180062 + (.1937657 * Rvs) + (.6497453 * Re)$$

$$R^2 = .91900$$

$$S.E.E. = .07726$$

where

Rp = ratio of proportional population (as reported by the U.S. Bureau of the Census), 1980 over 1970.

Rvs = ratio of proportional vital statistics, 1980 over 1970.

Re = ratio of proportional enrollment, 1980 over 1970.

The rate-correlation model is a transformation of the ratio-correlation model (A full explanation of it is found in a special report in Section IV of this issue of *Alaska Population Overview*). The model's characteristics are:

$$RRp = -.0032690 + (.2197264 * RRvs) + (.574595 * RRe)$$

$$R^2 = .85091$$

$$S.E.E. = .00873$$

# POPULATION DATA FOR 1970-1982: TECHNICAL DOCUMENTATION

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The data found in Section II of this issue of *Alaska Population Overview* are consistent with the definition of a resident population as used by the U.S. Bureau of the Census during the 1980 Decennial Census of Alaska.

The initial development began with a revised, July 1 estimate of the total state population for each year, 1970 to 1982. Once these estimates were developed, ratio-correlation and rate-correlation models were evaluated using revised, July 1st 1970 and 1980 data for the state's twenty-three census areas. The models selected for final use are described in Footnote No. 6 in the preceding report entitled "1982 Population Determination: Technical Documentation." Both models were used to generate initial estimates of the total population in each census area for each year, 1970 to 1979, 1981, and 1982. The results from the two models were then averaged to develop preliminary estimates.

The preliminary estimates were used in conjunction with annual births and deaths (July 1 to July 1) to develop initial estimates of annual net migration for each census area. These estimates were then averaged with estimates of net migration made using a Component II approach using school enrollment data to obtain revised estimates of annual net migration. These revised estimates of annual net migration were then used to develop revised total annual population figures for each census area. These were then adjusted to the annual state population figures to obtain provisional census area population totals for each year.

Once the provisional set of total population figures were available, work commenced on estimating the annual population of each census area by the age-sex groups found in Table II.2. First, the age-sex figures reported in the 1970 and 1980 census publications for April 1st were adjusted to the revised July 1st total populations for 1970 and 1980. Next, ratios of revised numbers in the 5-14 age group to reported fall enrollment (Grades 1-8) were developed. Rates of change in these ratios were developed using the same formula found in the report entitled "Improving the Measurement of Temporal Change in Regression Models Used for Population Estimates," which is found in Section IV. These rates of change were used to estimate the annual ratio of population aged 5-14 to the enrollment for each census area. The ratios were then multiplied by the reported annual enrollment to develop preliminary annual estimates of the population aged 5-14 in each census area. These figures were then adjusted to independently estimated annual state figures for the age-group 5-14. The state figures were estimated using the same approach used for the census areas.

The next age-group to be estimated was the number of persons aged 65 years and over. Again, revisions were made to the 1970 and 1980 census figures so these groups conformed to the revised total populations estimated for July 1st, 1970 and 1980. Ratios were developed for the state's total population aged 65 years and over to reported medicare enrollment. Rates of change in these ratios were developed using the formula described earlier. These rates of change were then used to estimate the state's annual ratio of persons aged 65 years and over to medicare enrollment. These ratios were then multiplied by reported medicare enrollment to obtain preliminary annual estimates of the population aged 65 years and over for the state. Next the share of the state level population aged 65 years and over was computed for each census area in 1970 and 1980. The annual rate of change in this share was calculated for each census area. This rate of change was then used to generate annual estimates of the proportion of the state population aged 65 years and over for each census area. These were then multiplied by the annual state total and a preliminary set of annual estimates for each census area was generated.

The third age group to be estimated was the number of persons aged 0-4. Here, two techniques were used. The first was similar to the one used for the age-group 5-14. Instead of using enrollment, however, ratios were formed of the population aged 5-14 in 1970 and 1980. Rates of change were calculated, which were used to develop an initial set of estimates using the preliminary numbers found for age-group 5-14. The second technique relied upon the annual number of births reported for each census area. Here, the annual births were subjected to a cohort-survival procedure in order to generate the expected annual number of persons aged 0-4 according to a combined survivorship and migration schedule. The results of this technique were averaged with the results of the preceding technique, and adjusted to the (averaged results) of the independently estimated state figures.

The final age group remaining, 15-64 years, was estimated using a "residual technique." Since estimates were available for the total population, ages 0-4, 5-14, and 65 years and over, simple subtraction from the total population of the other age-groups provided an initial annual estimate of the population age 15-64 in each census area. These initial estimates were modified using a two-way adjustment: one was to the

independently estimated annual state figure for this age-group; the other was made using a rate of change in the proportional share of the state found for each census area between 1970 and 1980. The results were then averaged, and revised state totals for this age-group were computed.

Once the age data for both sexes combined was available, the estimated number of females in each age group were constructed. The general procedure used the proportions of females in each age group as reported by the 1970 and 1980 census to compute rates of change. These were applied to each census area by age-groups to obtain initial estimates. The initial estimates were adjusted to independently estimated annual state figures for each age-group. The estimated number in age group 0-4 was also adjusted using reported sex ratios at birth, the cohort-survival technique described earlier for age-group 0-4, and the averaging procedure before finally being adjusted to independently estimated state figures for females aged 0-4 years.

The annual age-sex data given in Table II.2 represent trends that are known to have occurred since they are controlled to 1970 and 1980 census data. Over a period of several years the errors in these estimates will be, on the average, small. However, in any given year, the error for an individual census area, especially one with a very small population, may be severe. Other "errors" occur in Tables II.1 through II.4. These errors are due to rounding. All the age-group and components of change data are rounded to the nearest "10," while the total population is rounded to the nearest "100." For census areas with very small populations, the rounding produces some discontinuous "jumps" in going from year to year. Bristol Bay Borough is a prime example of this anomaly. For those desiring less discontinuity, these data can be smoothed using rates of change so that instead of a period of three years showing "10 and then a sudden jump to "20 females," annual numbers showing, say, 7, 11, 14, and 18 females would result.

# ALASKA LIFE TABLES, 1970 AND 1980

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## Introduction

Revised Life Tables for Alaska are presented in Tables 1 through 6 for males, females and total population for 1970 and 1980. Revisions were necessary to the tables previously published to adjust for corrected 1980 census age distributions as well as mathematical errors. An additional table is presented for comparison purposes—the 1959-61 Alaska Life Table for the total population / / which has been adjusted to 5 year age groups for ease of comparison.

## Discussion

A cursory comparison of the $e^{\circ}$ values or life expectancy over the past 20 years indicates increased longevity in all ages, an average of 3.48 years. Larger gains have been made in the first years' survivorship which are noticeable not only in the increased life expectancy for persons under 1 year but also in the narrowing gap between the different Life Table functions for under 1 year and 1-4 years. A comparison of the $e^{\circ}$ values also shows larger increases in life expectancy across the 40-55 year span.

The lx column indicates survivorship. It can readily be turned into percentages so that according to 1960 life expectancy calculations, only 76% of persons born then would reach age 60, while in 1980 this percentage increases to 82%. In the lx column for 1960, age 60-64, it shows 76,010 persons of a theoretical 100,000 born, surviving to age 60. In the 1980 table this becomes 81,763 persons surviving out of 100,000. For planning purposes, the 1960 census counted 7,101 persons under 1 year. Multiplying by the 1960 lx shows that only 5,397 of these people will be living at age 60.

The qx column represents the probability of dying before reaching the next age interval. If one reached the age of 60, according to the 1960 life tables, one had a 10.27% chance of dying before age 65. Once reaching 65, a 15.29% chance of dying before age 70, a 21.88% chance of dying before 75. In 1970 the percentages change to 10.53%, 16.01% and 16.35%, while in 1980 the percentages drop to 8.17%, 14.60% and 15.99%. For planning purposes this means that when in 1960 the census counted 7,955 persons age 50-54, there should be (with no migration considered) 7,095 persons age 60-64 in 1970 and the 1970 census counted only 5,310 indicating a considerable out-migration in this age group. Taking the 5310 persons age 60-64 in 1970 and surviving this group forward to 1980, one should find 3,990 persons in the 70-74 age group, yet the census counted 3,106 persons when the total population of the state grew by 33.7%.

Life table functions need not be confined to human mortality aspects. If, instead of deaths and population by age, one uses drop-outs and school grade enrollments, a probability rate (qx) can be calculated for various grade levels. Comparison studies can be made on the areas of and ages for lessening school participation.

1/ *Life Tables: 1959-61, V.2 N.2*, U.S. Department of Health, Education and Welfare (Washington, D.C. 1966).

## Definitions

(1) Age: (x) Abridged table with 5 year groupings with the exception of the special groupings at the beginning and end of the ages.

(2) Population used to compute death rate (Mx): April 1, 1970/80 census count.

(3) Deaths: Twelve months total deaths, October 1969/1979 through September 1970/1980 as tabulated by the Alaska Bureau of Vital Records of the Department of Health and Social Services.

(4) Death Rate: $$M_x = \frac{\text{Deaths}}{\text{Population}}$$

(5) Probability of Dying: Represents the probability of dying before reaching the next age group.

$$q_x = \frac{10\ (M_x)}{2+5(M_x)}$$

except for the first two age groups which are calculated as follows:

$$q_0 = \frac{\text{actual deaths to age group}}{\text{births}}$$

$$q_{1-4} = \frac{8\ (M_x)}{2+4(M_x)}$$

(6) Number Surviving: Out of a theoretical population (age 0) of 100,000, this many will be alive at the beginning of this age interval.

$$l_x = l_{x-5} - d_{x-5}$$

(7) Number Dying: Out of a theoretical population (age 0) of 100,000, this number will die during this age interval.

$$d_x = (q_x)(l_x)$$

(8) Years Lived: Total number of person years lived during each age interval.

$$L_x = \frac{d_x}{M_x}$$

$$\text{except for } L_0 = .3\ l_0 + .7\ l_1$$

(9) Years Remaining: Total number of person years remaining.

$$T_x = \sum_{75+}^{0} L_x$$

(10) Life Expectancy: Represents the number of years of life expected after attaining age (x).

$$e_x^\circ = \frac{\Sigma T_x}{l_0}$$

## References

George W. Barclay, *Techniques of Population Analysis* (New York, 1958).

James A. Palmore, *Measuring Mortality: A Self-Teaching Guide to Elementary Measures*, Paper No. 15, East-West Center, (Honolulu, 1971).

TABLE 1

Revised Life Table - Total Population 1980

| Age | Population | Deaths | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|---|---|
| Under 1 year | 8753 | 141 | .016109 | .015169 | 100000 | 1517 | 98938 | 7269645 | 72.70 |
| 1-4 years | 30196 | 29 | .000960 | .003833 | 98483 | 377 | 392708 | 7170707 | 72.81 |
| 5-9 years | 35043 | 13 | .000371 | .001853 | 98106 | 182 | 490566 | 6777999 | 69.09 |
| 10-14 years | 34282 | 11 | .000321 | .001604 | 97924 | 157 | 489097 | 6287433 | 64.21 |
| 15-19 years | 37154 | 68 | .001830 | .009108 | 97767 | 890 | 486339 | 5798336 | 59.31 |
| 20-24 years | 45090 | 100 | .002218 | .011029 | 96877 | 1068 | 481515 | 5311997 | 54.83 |
| 25-29 years | 48645 | 98 | .002015 | .010024 | 95809 | 960 | 476427 | 4830482 | 50.42 |
| 30-34 years | 42163 | 87 | .002063 | .010262 | 94849 | 973 | 471643 | 4354055 | 45.91 |
| 35-39 years | 31316 | 73 | .002331 | .011587 | 93876 | 1088 | 466752 | 3882412 | 41.36 |
| 40-44 years | 22706 | 83 | .003655 | .018109 | 92788 | 1680 | 459644 | 3415660 | 36.81 |
| 45-49 years | 18404 | 73 | .003967 | .019640 | 91108 | 1789 | 450971 | 2956016 | 32.45 |
| 50-54 years | 15839 | 113 | .007134 | .035045 | 89319 | 3130 | 436744 | 2505045 | 28.05 |
| 55-59 years | 12617 | 133 | .010541 | .051352 | 86189 | 4426 | 419884 | 2066301 | 23.97 |
| 60-64 years | 8096 | 138 | .017045 | .081742 | 81763 | 6683 | 392080 | 1646417 | 20.14 |
| 65-69 years | 5206 | 164 | .031502 | .146011 | 75080 | 10963 | 348010 | 1254337 | 16.71 |
| 70-74 years | 3106 | 108 | .034771 | .159951 | 64117 | 10256 | 294256 | 906327 | 14.14 |
| 75 years and over | 3235 | 285 | .088099 | 1.000000 | 53861 | 53861 | 611369 | 611369 | 11.35 |

TABLE 2

Revised Life Table - Males 1980

| Age | Population | Deaths | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|---|---|
| Under 1 year | 4452 | 82 | .018419 | .017329 | 100000 | 1733 | 98787 | 6819205 | 68.19 |
| 1-4 years | 15588 | 16 | .001026 | .004096 | 98267 | 402 | 391813 | 6720418 | 68.39 |
| 5-9 years | 17943 | 8 | .000446 | .002228 | 97865 | 218 | 488789 | 6328605 | 64.67 |
| 10-14 years | 17720 | 9 | .000508 | .002537 | 97647 | 248 | 488189 | 5839816 | 59.81 |
| 15-19 years | 19819 | 50 | .002523 | .012536 | 97399 | 1221 | 483948 | 5351627 | 54.95 |
| 20-24 years | 24186 | 83 | .003432 | .017014 | 96178 | 1636 | 476690 | 4867679 | 50.61 |
| 25-29 years | 25564 | 73 | .002856 | .014179 | 94542 | 1341 | 469538 | 4390989 | 46.44 |
| 30-34 years | 22676 | 67 | .002955 | .014667 | 93201 | 1367 | 462606 | 3921451 | 42.08 |
| 35-39 years | 17077 | 52 | .003045 | .015110 | 91834 | 1388 | 455829 | 3458845 | 37.66 |
| 40-44 years | 12484 | 58 | .004646 | .022963 | 90446 | 2077 | 447051 | 3003016 | 33.20 |
| 45-49 years | 9982 | 52 | .005209 | .025710 | 88369 | 2272 | 436168 | 2555965 | 28.92 |
| 50-54 years | 8711 | 74 | .008495 | .041592 | 86097 | 3581 | 421542 | 2119797 | 24.62 |
| 55-59 years | 6777 | 90 | .013280 | .064266 | 82516 | 5303 | 399322 | 1698255 | 20.58 |
| 60-64 years | 4303 | 104 | .024169 | .113959 | 77213 | 8799 | 364061 | 1298933 | 16.82 |
| 65-69 years | 2740 | 110 | .040146 | .182421 | 68414 | 12480 | 310865 | 934872 | 13.66 |
| 70-74 years | 1538 | 71 | .046164 | .206937 | 55934 | 11575 | 250737 | 624007 | 11.16 |
| 75 years and over | 1481 | 176 | .118839 | 1.000000 | 44359 | 44359 | 373270 | 373270 | 8.41 |

TABLE 3

Revised Life Table - Females 1980

| Age | Population | Deaths | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|---|---|
| Under 1 year | 4301 | 59 | .013718 | .012944 | 100000 | 1294 | 99094 | 7985670 | 79.86 |
| 1-4 years | 14608 | 13 | .000890 | .003554 | 98706 | 351 | 394382 | 7886576 | 79.90 |
| 5-9 years | 17100 | 5 | .000292 | .001459 | 98355 | 143 | 493151 | 7492194 | 76.18 |
| 10-14 years | 16562 | 9 | .000543 | .002711 | 98211 | 266 | 492593 | 6999043 | 71.27 |
| 15-19 years | 17335 | 18 | .001038 | .005177 | 98945 | 507 | 488439 | 6506450 | 66.43 |
| 20-24 years | 20904 | 17 | .000813 | .004057 | 97438 | 395 | 485855 | 6018011 | 61.76 |
| 25-29 years | 23081 | 25 | .001083 | .005400 | 97043 | 524 | 483841 | 5532156 | 57.01 |
| 30-34 years | 19487 | 20 | .001026 | .005117 | 96519 | 494 | 481482 | 5048315 | 52.30 |
| 35-39 years | 14239 | 21 | .001475 | .007348 | 96025 | 706 | 478644 | 4566833 | 47.56 |
| 40-44 years | 10222 | 25 | .002446 | .012156 | 95319 | 1159 | 473835 | 4088189 | 42.89 |
| 45-49 years | 8422 | 21 | .002493 | .012388 | 94160 | 1167 | 468111 | 3614354 | 38.39 |
| 50-54 years | 7128 | 39 | .005471 | .026986 | 92993 | 2510 | 458783 | 3146243 | 33.83 |
| 55-59 years | 5840 | 43 | .007363 | .036149 | 90483 | 3271 | 444248 | 2687460 | 29.70 |
| 60-64 years | 3793 | 34 | .008964 | .043836 | 87212 | 3823 | 426484 | 2243212 | 25.72 |
| 65-69 years | 2466 | 54 | .021898 | .103807 | 83389 | 8656 | 395287 | 1816728 | 21.79 |
| 70-74 years | 1568 | 37 | .023597 | .111412 | 74733 | 8326 | 352842 | 1421441 | 19.02 |
| 75 years and over | 1754 | 109 | .062144 | 1.000000 | 66407 | 66407 | 1068599 | 1068599 | 16.09 |

TABLE 4

Revised Life Table - Total Population 1970

| Age | Population | Deaths | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|---|---|
| Under 1 year | 6969 | 162 | .023246 | .022068 | 100000 | 2207 | 98465 | 7058548 | 70.59 |
| 1-4 years | 25106 | 28 | .001115 | .004450 | 97793 | 435 | 390135 | 6960101 | 71.17 |
| 5-9 years | 36709 | 23 | .000627 | .003130 | 97358 | 305 | 486443 | 6569966 | 67.48 |
| 10-14 years | 34248 | 13 | .000380 | .001898 | 97053 | 184 | 484211 | 6083523 | 62.68 |
| 15-19 years | 26768 | 53 | .001980 | .009851 | 96869 | 954 | 481818 | 5599312 | 57.80 |
| 20-24 years | 35576 | 77 | .002164 | .010762 | 95915 | 1032 | 476895 | 5117494 | 53.35 |
| 25-29 years | 38711 | 99 | .002209 | .010984 | 94883 | 1042 | 471707 | 4640599 | 48.91 |
| 30-34 years | 32588 | 46 | .002036 | .010120 | 93841 | 950 | 466601 | 4168892 | 44.43 |
| 35-39 years | 29561 | 63 | .003064 | .015204 | 92891 | 1412 | 460836 | 3702291 | 39.86 |
| 40-44 years | 27469 | 77 | .004410 | .021810 | 91479 | 1995 | 452381 | 3241455 | 35.43 |
| 45-49 years | 25132 | 108 | .007137 | .035059 | 89484 | 3137 | 439540 | 2789074 | 31.17 |
| 50-54 years | 21807 | 99 | .008385 | .041064 | 86347 | 3546 | 422898 | 2349534 | 27.21 |
| 55-59 years | 18550 | 109 | .012749 | .063542 | 82801 | 5261 | 402660 | 1926636 | 23.27 |
| 60-64 years | 15310 | 118 | .022222 | .105262 | 77540 | 8162 | 367294 | 1513976 | 19.53 |
| 65-69 years | 13131 | 109 | .034813 | .160129 | 69378 | 11109 | 319105 | 1146682 | 16.53 |
| 70-74 years | 11573 | 96 | .035601 | .163457 | 58269 | 9524 | 267521 | 827577 | 14.20 |
| 75 years and over | 21833 | 190 | .087036 | 1.000000 | 48745 | 48745 | 560056 | 560056 | 11.49 |

TABLE 5

Revised Life Table - Males 1970

| Age | Population | Deaths | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|---|---|
| Under 1 year | 3955 | 88 | .024754 | .023874 | 100000 | 2387 | 98329 | 6691348 | 66.91 |
| 1-4 years | 12917 | 19 | .001471 | .005867 | 97613 | 573 | 389531 | 6593019 | 67.54 |
| 5-9 years | 18760 | 13 | .000693 | .003459 | 97040 | 336 | 484848 | 6203488 | 63.93 |
| 10-14 years | 17533 | 9 | .000513 | .002562 | 96704 | 248 | 483431 | 5718640 | 59.14 |
| 15-19 years | 14186 | 41 | .002890 | .014346 | 96456 | 1384 | 478893 | 5235209 | 54.28 |
| 20-24 years | 22419 | 60 | .002676 | .013291 | 95072 | 1264 | 472347 | 4756316 | 50.03 |
| 25-29 years | 14149 | 45 | .003180 | .015775 | 93808 | 1480 | 465409 | 4283969 | 45.66 |
| 30-34 years | 12178 | 30 | .002374 | .014267 | 92328 | 1317 | 458246 | 3818560 | 41.36 |
| 35-39 years | 11363 | 42 | .003696 | .018311 | 91011 | 1667 | 451028 | 3360314 | 36.92 |
| 40-44 years | 9726 | 49 | .005038 | .024877 | 89344 | 2223 | 441247 | 2909286 | 32.56 |
| 45-49 years | 8263 | 76 | .009198 | .044956 | 87121 | 3917 | 425853 | 2468039 | 28.33 |
| 50-54 years | 6483 | 68 | .010489 | .051105 | 83204 | 4252 | 405377 | 2042186 | 24.54 |
| 55-59 years | 4881 | 77 | .015775 | .075882 | 78952 | 5991 | 379778 | 1636809 | 20.73 |
| 60-64 years | 2989 | 86 | .028772 | .134207 | 72961 | 9792 | 340331 | 1257031 | 17.23 |
| 65-69 years | 1798 | 79 | .043938 | .197947 | 63169 | 12504 | 284583 | 916700 | 14.51 |
| 70-74 years | 853 | 40 | .046893 | .209862 | 50665 | 10633 | 226750 | 632117 | 12.48 |
| 75 years and over | 1205 | 119 | .098755 | 1.000000 | 40032 | 40032 | 405367 | 405367 | 10.13 |

TABLE 6

Revised Life Table - Females 1970

| Age | Population | Deaths | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|---|---|
| Under 1 year | 3414 | 74 | .021675 | .020246 | 100000 | 2025 | 98583 | 7629435 | 76.29 |
| 1-4 years | 12189 | 9 | .000738 | .002948 | 97975 | 289 | 391599 | 7530852 | 76.87 |
| 5-9 years | 17949 | 10 | .000557 | .002781 | 97686 | 272 | 488330 | 7139253 | 73.08 |
| 10-14 years | 16715 | 4 | .000239 | .001194 | 97414 | 116 | 485356 | 6650923 | 68.27 |
| 15-19 years | 12582 | 12 | .000954 | .004759 | 97298 | 463 | 485325 | 6165567 | 63.37 |
| 20-24 years | 13157 | 17 | .001292 | .006439 | 96835 | 624 | 482972 | 5680242 | 58.66 |
| 25-29 years | 12562 | 14 | .001114 | .005555 | 96211 | 534 | 479354 | 5197270 | 54.02 |
| 30-34 years | 10410 | 11 | .001057 | .005271 | 95677 | 504 | 476821 | 4717916 | 49.31 |
| 35-39 years | 9198 | 21 | .002283 | .011350 | 95173 | 1080 | 473062 | 4241095 | 44.56 |
| 40-44 years | 7734 | 25 | .003620 | .017938 | 94093 | 1688 | 466290 | 3768033 | 40.05 |
| 45-49 years | 6869 | 32 | .004659 | .023027 | 92405 | 2128 | 456750 | 3301735 | 35.73 |
| 50-54 years | 5328 | 31 | .005823 | .028697 | 90277 | 2591 | 444960 | 2844985 | 31.51 |
| 55-59 years | 3669 | 32 | .008722 | .042679 | 87686 | 3742 | 429030 | 2400025 | 27.37 |
| 60-64 years | 2321 | 32 | .013787 | .066638 | 83944 | 5594 | 405745 | 1970995 | 23.48 |
| 65-69 years | 1333 | 30 | .022506 | .106536 | 78350 | 8347 | 370879 | 1565250 | 19.98 |
| 70-74 years | 720 | 16 | .022222 | .105262 | 70003 | 7369 | 331608 | 1194371 | 17.06 |
| 75 years and over | 978 | 71 | .072597 | 1.000000 | 62634 | 62634 | 862763 | 862763 | 13.77 |

TABLE 7

Life Table - Total Population Alaska 1959-61

| Age | $M_x$ | $q_x$ | $l_x$ | $d_x$ | $L_x$ | $T_x$ | $e^o$ |
|---|---|---|---|---|---|---|---|
| Under 1 year | .041586 | .040300 | 100000 | 4030 | 96908 | 6751431 | 67.51 |
| 1-4 years | .001887 | .007513 | 95970 | 721 | 382055 | 6654523 | 69.34 |
| 5-9 years | .000850 | .004242 | 95249 | 404 | 475219 | 6272468 | 65.85 |
| 10-14 years | .000897 | .004439 | 94845 | 421 | 473205 | 5797249 | 61.12 |
| 15-19 years | .001162 | .005793 | 94424 | 547 | 470823 | 5324044 | 56.38 |
| 20-24 years | .001531 | .007627 | 93877 | 716 | 467615 | 4853221 | 51.70 |
| 25-29 years | .001525 | .007600 | 93161 | 708 | 464111 | 4385606 | 47.08 |
| 30-34 years | .002400 | .011930 | 92453 | 1103 | 459640 | 3921495 | 42.42 |
| 35-39 years | .002990 | .014844 | 91350 | 1356 | 453500 | 3461855 | 37.90 |
| 40-44 years | .004283 | .021201 | 89994 | 1908 | 445508 | 3008355 | 33.43 |
| 45-49 years | .006592 | .032457 | 88086 | 2859 | 433696 | 2562847 | 29.09 |
| 50-54 years | .009452 | .046922 | 85227 | 3939 | 416733 | 2129151 | 24.98 |
| 55-59 years | .013395 | .064239 | 81228 | 5278 | 394025 | 1712418 | 21.07 |
| 60-64 years | .021598 | .102750 | 76010 | 7810 | 361615 | 1318393 | 17.34 |
| 65-69 years | .033019 | .152947 | 68200 | 10431 | 315912 | 956778 | 14.03 |
| 70-74 years | .048973 | .218751 | 57769 | 12637 | 258038 | 640866 | 11.09 |
| 75 years and over | .117891 | 1.000000 | 45132 | 45132 | 382828 | 382828 | 8.48 |

Source: Life Tables: 1959-61, V. 2, N. 2, U. S. Department of Health Education and Welfare (Washington, D.C. 1966)

# SPECIAL CENSUS RESULTS FOR OIL RELATED WORKSITES IN THE NORTH SLOPE BOROUGH

Barbara Baker
David A. Swanson
Jo Van Patten

## PREFACE

This report provides the results taken from a special census of the entire North Slope Borough (excluding the City of Barrow) that was conducted to provide an official state population determination for 1981. The census was paid for by the North Slope Borough, which awarded the work to a private contractor. The State of Alaska provided technical assistance, quality control, and general supervision of the census through the State Demographer and staff from the Research and Analysis Section, Alaska Department of Labor.

The report is comprised of two sections. The first section provides data resulting from the census for oil-related worksites in the North Slope Borough. It includes information on state of usual residence, areas within Alaska of usual residence, the number of males and females at oil-related worksites, and the number of persons by type of camp. A place of usual residence is a specific living arrangement established for occupancy when the person is not at the worksite.

The second section contains the technical documentation for the special census and includes a description of methodology, interview characteristics, quality control, and a glossary of terms. Because of confidentiality restrictions, no information is available that would identify individual firms or persons.

## HIGHLIGHTS

- 6,306 people were at oil-related worksites in the North Slope Borough at time of the special census (late January and early February, 1982).
- 77.3 percent of all persons at oil-related worksites claimed Alaska as their usual place of residence.
- Washington was the state outside of Alaska most frequently identified as the usual place of residence.
- Anchorage was claimed by 39.6 percent of all persons at oil-related worksites as their usual place of residence.
- 9.4 percent of all persons at oil-related worksites were female.
- 29.9 percent of all people at oil-related worksites were housed in camps identified as "trades and construction".

TABLE 1

PERSONS AT OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH
BY STATE OF USUAL RESIDENCE

| State | Number Naming State as Usual Residence | State | Number Naming State as Usual Residence |
|---|---|---|---|
| Alabama | 20 | New Hampshire | 4 |
| Alaska* | 4874 | New Jersey | 6 |
| Arizona | 25 | New Mexico | 22 |
| Arkansas | 10 | New York | 3 |
| California | 204 | North Carolina | 6 |
| Colorado | 52 | North Dakota | 18 |
| Connecticut | 2 | Ohio | 4 |
| Delaware | 0 | Oklahoma | 54 |
| District of Columbia | 0 | Oregon | 73 |
| Florida | 16 | Pennsylvania | 15 |
| Georgia | 1 | Rhode Island | 0 |
| Hawaii | 9 | South Carolina | 7 |
| Idaho | 47 | South Dakota | 7 |
| Illinois | 10 | Tennessee | 7 |
| Indiana | 1 | Texas | 185 |
| Iowa | 4 | Utah | 22 |
| Kansas | 3 | Vermont | 2 |
| Kentucky | 9 | Virginia | 0 |
| Louisiana | 44 | Washington | 264 |
| Maine | 2 | West Virginia | 1 |
| Maryland | 9 | Wisconsin | 13 |
| Massachusetts | 2 | Wyoming | 31 |
| Michigan | 20 | | |
| Minnesota | 23 | | |
| Mississippi | 18 | Foreign Country | 35 |
| Missouri | 9 | | |
| Montana | 84 | | |
| Nebraska | 6 | TOTAL | 6306 |
| Nevada | 23 | | |

* Includes persons claiming no usual place of residence

TABLE 2

THE TEN STATES WITH THE HIGHEST NUMBER OF PERSONS
AT OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH

| Rank | State | Number Naming State as Usual Place of Residence | Percent |
|---|---|---|---|
| 1 | Alaska* | 4874 | 77.3 |
| 2 | Washington | 264 | 4.2 |
| 3 | California | 204 | 3.2 |
| 4 | Texas | 185 | 2.9 |
| 5 | Montana | 84 | 1.3 |
| 6 | Oregon | 73 | 1.2 |
| 7 | Oklahoma | 54 | 0.9 |
| 8 | Colorado | 52 | 0.8 |
| 9 | Idaho | 47 | 0.7 |
| 10 | Louisiana | 44 | 0.7 |
| | All other states | 390 | 6.2 |
| | Foreign countries | 35 | 0.6 |
| | TOTAL | 6306 | 100.0 |

* Includes persons claiming no usual place of residence

TABLE 3

PERSONS AT OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH
NAMING ALASKA AS THEIR USUAL PLACE OF RESIDENCE
BY 1980 CENSUS AREA

| 1980 Census Area | Number of Persons Naming Area as their Usual Place of Residence |
|---|---|
| Aleutian Islands | 0 |
| Anchorage, Municipality of | 2496 |
| Bethel | 10 |
| Bristol Bay Borough | 0 |
| Dillingham | 2 |
| Fairbanks - North Star Borough | 1094 |
| Haines Borough | 10 |
| Juneau, City and Borough of | 44 |
| Kenai Peninsula Borough | 437 |
| Ketchikan Gateway Borough | 3 |
| Kobuk | 28 |
| Kodiak Island Borough | 6 |
| Matanuska - Susitna Borough | 413 |
| Nome | 9 |
| North Slope Borough* | 178 |
| Prince of Wales - Outer Ketchikan | 0 |
| Sitka, City and Borough of | 7 |
| Skagway - Yakutat - Angoon | 3 |
| Southeast Fairbanks | 37 |
| Valdez - Cordova | 31 |
| Wade Hampton | 1 |
| Wrangell - Petersburg | 6 |
| Yukon - Koyukuk | 59 |
| TOTAL | 4874 |

*Includes persons claiming no usual place of residence

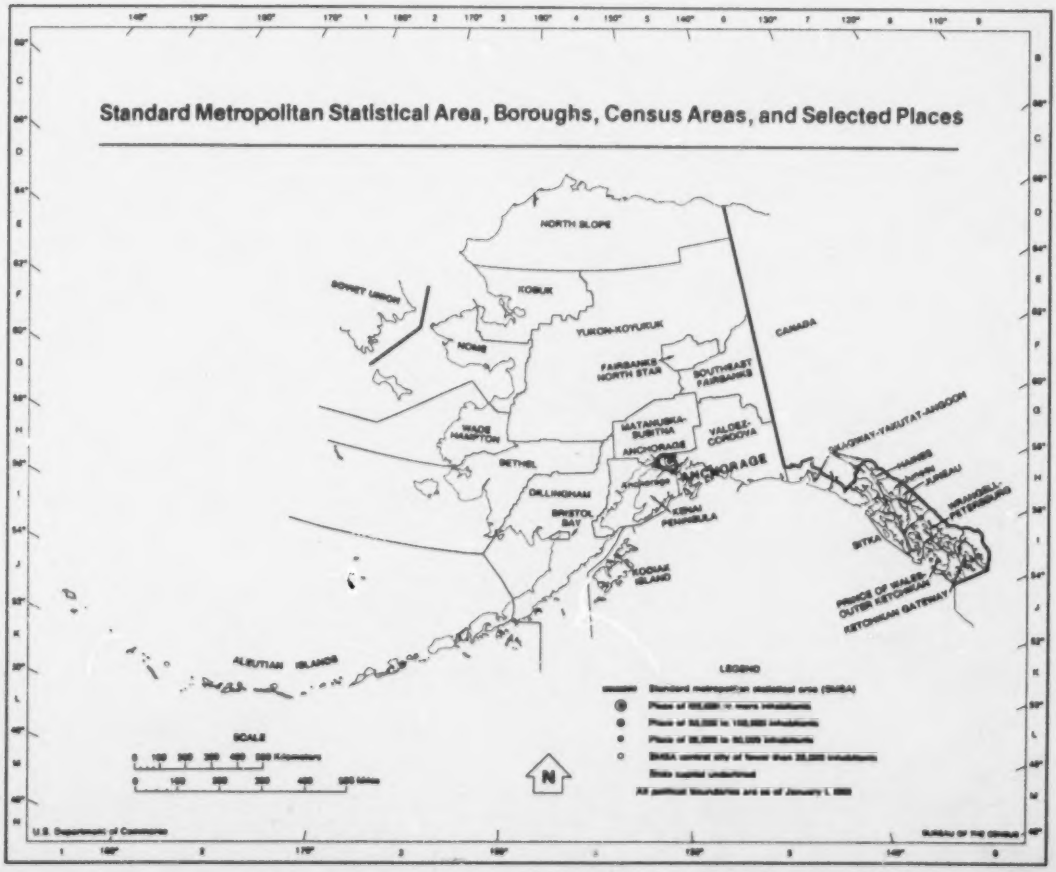

TABLE 4

THE FIVE CENSUS AREAS IN ALASKA WITH THE HIGHEST NUMBER OF PERSONS AT OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH

| Rank | | Number Naming Area As Usual Place of Residence | Percent |
|---|---|---|---|
| 1 | Anchorage, Municipality of | 2496 | 51.3 |
| 2 | Fairbanks - North Star Borough | 1094 | 22.6 |
| 3 | Kenai Peninsula Borough | 437 | 9.1 |
| 4 | Matanuska - Susitna Borough | 413 | 8.0 |
| 5 | North Slope Borough* | 178 | 3.7 |
| All Other Census Areas | | 256 | 5.3 |
| Total | | 4874 | 100.0 |

* Includes persons claiming no usual place of residence

TABLE 5

PERSONS AT OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH BY SEX

| Sex | Number | Percent |
|---|---|---|
| Male | 5711 | 90.6 |
| Female | 595 | 9.4 |
| TOTAL | 6306 | 100.0 |

TABLE 6

NUMBER OF PERSONS AT OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH BY REGION OF USUAL PLACE OF RESIDENCE AND TYPE OF CAMP

| Type Of Camp | Number Naming Alaska as Usual Place of Residence* | Number Naming Usual Place of Residence Outside of Alaska | TOTAL |
|---|---|---|---|
| Operations | 876 | 87 | 963 |
| Trades, Construction | 1352 | 532 | 1884 |
| Oil Rig | 1140 | 291 | 1431 |
| Seismic | 135 | 84 | 219 |
| Tech. Services and Fabrication | 59 | 47 | 106 |
| Government | 34 | 1 | 35 |
| Ground Transportation | 219 | 65 | 284 |
| Air Transportation | 49 | 11 | 60 |
| Supply, Services, Repair | 297 | 107 | 404 |
| General | 713 | 207 | 920 |
| TOTAL | 4874 | 1432 | 6306 |

*Includes people claiming no usual place of residence

# TECHNICAL DOCUMENTATION FOR CENSUS OF OIL-RELATED WORKSITES IN THE NORTH SLOPE BOROUGH

The results of special census of the North Slope Borough (excluding the city of Barrow) are reported using procedures and definitions in accordance with those used by the U.S. Bureau of the Census during the 1980 decennial federal census. Because of the special nature of the oil-related worksites in the North Slope Borough, certain modifications to standard census procedures were required. Two notable modifications were the general inability to conduct "callbacks" and the canvassing of people by where they ate rather than where they slept.

Each camp and distinct set of living quarters was identified as an "Enumeration District" and scheduled for enumeration according to location and "change over days". The major oil companies and associated contractors were extremely cooperative in developing both the list of camps and living units and a feasible schedule.

In general, each camp and living quarters was canvassed during a mealtime, usually evening. For a large camp, virtually every enumerator was present in order to maximize the number of interviews. Since "callbacks" were not generally possible, the completed number of interviews at a large camp was compared to the total headcount (of the previous night) obtained from the manager in order to obtain the number of missing interviews. Persons interviewed at each camp were asked the location of the camp at which they slept the night prior to the enumeration in order to screen out visitors.

In small camps and living quarters, the procedures were similar to those used in the large camps. However, at most of these sites it was possible to use "callback" procedures in order to obtain missing interviews. Consequently, a higher proportion of persons in small camps and living quarters were interviewed than were interviewed in large camps.

At some isolated oil rigs and seismic trains, as well as along the pipeline corridor, it was not possible to conduct personal interviews due to security policies. At these sites (Enumeration Districts) a headcount was obtained and census forms were delivered for self-administration. No callback procedure was possible at these sites.

Of the 6,306 people identified as being on site, 4,357 or 69.1 percent completed the interview. The characteristics found at each specific site were used as a basis for allocating the characteristics to the remaining non-respondents at the site. An additional set of adjustments was made using information from a systematic sample of persons selected for second interviews. The second interview was an in-depth probe that was used as a quality control check on the interviews obtained by the enumerators. A small, selected group of enumerators was responsible for obtaining the second interviews and their abilities and greater amount of time spent with a respondent were assumed to produce a more accurate interview. 4.8 percent of all persons interviewed were re-interviewed. In matching the second interview against the first, it was found that zero errors occurred for the place of usual residence. In cases, where the interview was self-administered (N=582), no second interviews were possible. Consequently, neither estimates of errors nor adjustments were possible.

Using the definitions developed by the U.S. Bureau of the Census, virtually 99 percent of the people at oil-related worksites in the North Slope Borough live in "group quarters" rather than "housing units". Consequently, no information concerning housing and household characteristics is available because of the confidentiality restrictions.

The identification of a person's sex was done by observation and name identification and, where sex was clearly distinguished, the person's corresponding census form was marked with "M" for male or "F" for female in the lower right hand corner. 87 percent of the completed interviews had identification by sex. On a site specific (Enumeration District) basis, sexual identification of respondents was allocated to non-respondents.

## Glossary of Terms

**Camp or living quarters** A self-contained facility with sleeping quarters and food service that has its own outside entrance and is physically separated from any other self-contained facility used for sleeping and eating.

**Enumeration district** A concept used for purposes of census administration that is equivalent to a camp or living quarters.

**Group quarters** A living arrangement established for a group of unrelated people living together in which a common kitchen or food service is utilized and rooms intended for occupancy are not living quarters with separate eating facilities with direct access from the outside of building or through a common hall.

**Household** A family or group of six or less unrelated individuals living together with common housekeeping arrangements in the same housing unit.

**Housing unit** One or more rooms intended for occupancy as separate living quarters. Occupants must live and eat separately from everyone else in the building and have direct access from the outside of the building or through a common hall or have complete kitchen facilities for their household only. Complete kitchen facilities include a sink with piped water, a range, and a mechanical refrigerator.

**Person with no usual place of residence** A person without a specific, fixed living arrangement established for occupancy when the person is not at a worksite.

**Place of usual residence** A specific, fixed living arrangement established for occupancy when the person is not at a worksite.

**Type of camp** The general functional orientation of primary activities engaged in by an employer running a camp or by camp residents.

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## ABSTRACT

The Housing Unit Method has received recent support as an accurate, cost-effective means of municipal population estimation, especially at the state-municipal level of interaction. In further support of this technique, some of its conceptual and practical features are described and compared with other methods of municipal population estimation. In particular, the logical relationship between the Housing Unit Method and a headcount census program is shown to be one of the method's strongest features, which, in itself, generates many benefits. The most important one is that it provides a cost-effective, standardized system that encourages the empirical resolution of the disputes over population estimates that can occur between a state demographic center and a municipality.

## INTRODUCTION

In a series of recent reports, the Housing Unit Method of Population Estimation has received attention long overdue from the standpoint of the demographic centers in many states that prefer this method for municipal population estimation. The reports (Smith and Mandell, 1982; Smith and Lewis, 1980; Findley and Reinhardt, 1980; Voss and Krebs, 1979; Lowe, Pittenger, and Walker, 1977; and Rives, 1976) virtually define the current body of literature associated with the Housing Unit Method, which is unfortunate because of the method's widespread use by state demographic centers and municipalities (U.S. Bureau of the Census, 1978). This condition is due, perhaps, to a mistaken belief held by many academic and applied demographers that results reported by Starsinic and Zitter (1968) indicated that the Housing Unit Method did not require additional consideration as a topic of research in spite of its widespread use. Contrary to this belief, research reported by Smith and Lewis (1980) is premised on the argument that the Housing Unit Method is not only a legitimate research topic but, further, is conceptually clear, theoretically sound, and capable of producing accurate population estimates. Smith and Lewis support the assertion by Lowe, Pittenger, and Walker (1977) that once the data components of the method are known, an exact determination of population is available; any "error" is due to inaccuracies in calculations or the components, not to an inherent flaw in the method itself. In addition, strategies have been devised to obtain the data needed for each of the components of the Housing Unit Method. Subsequent to Morrison's (1971:22) reiteration of Starsinic and Zitter's position that "the Housing Unit Method is beset with several weaknesses. . .(and that). . .each step. . .must be based on sketchy information or intuition," the work of Lowe, Pittenger, and Walker (1977), Smith and Lewis (1980), and Findley and Reinhardt (1980), among others, has clearly demonstrated viable means of obtaining the necessary data.

In this paper, some conceptual and practical features of the Housing Unit Method are described and compared with other techniques of municipal population estimation. Attention is focused on the logical relationship between the Housing Unit Method and a municipal census program, illuminating the strong conceptual and practical features of the Housing Unit Method that are not matched by any other technique for estimating municipal populations. The perspective taken in this paper is that of a state-municipal level of interaction. Although the federal population estimation program is generally perceived by the public and academic demographers to be the only source of annual, municipal population determinations, virtually every state has an agency (state demographic center) responsible for producing an annual set of municipal population determinations. These determinations usually either: (1) originate with a municipality, are submitted to the state demographic center for review, possible adjustment, and final approval; or (2) originate with the state demographic center, are reviewed by each municipality, and, possibly adjusted before becoming final. These systems are maintained because many states provide revenues to municipalities through allocation formulas that use annual population determinations as a component.//

## PRELIMINARY CONSIDERATIONS

The Housing Unit Method relies upon the straightforward assumption that nearly all Americans sleep under some kind of shelter. Unlike many other data series often used as indicators in developing regression-based models for estimating population—births, deaths, voter registration, school enrollments, automobile registration, employment, and tax records—the Housing Unit Method provides an exact demographic identity: the population of any given place is defined by

$$[(H)(O)(PPH)] + GQ = P$$

where

H = Total Housing Units
O = Proportion of Occupied Units
PPH = Mean Number of Persons Per Household
GQ = Number of People Residing in Group Quarters
P = Population

The four components, total Housing Units, proportion of Occupied Units, mean number of Persons per Household, and the number of people residing in Group Quarters, provide the basis for making the Housing Unit Method a sound conceptual and practical technique. If the four components are known, the exact total population is known. In using the technique, the key issue in its accuracy is the determination of each of the four components.

In addition to its theoretical elegance the Housing Unit Method provides a practical approach to municipal population estimation in that it can be employed by people who have not received formal training in demography. Unlike more complicated techniques such as Stable Population Theory (Coale and Demeny, 1966), Multiregional Dynamics (Rogers and Willekens, 1978), Multiple Regression (e.g., Mandell and Tayman, 1982; Swanson, 1980; Schmitt and Crosetti, 1954), Synthetic Methods (National Center for Health Statistics, 1968), and Categorical Data Analysis (Purcell and Kish, 1980), the Housing Unit Method can be effectively applied to small areas, either in isolation or as part of a larger geographical system, by people with limited demographic training.

## CRITIQUE OF RATIO-BASED POPULATION ESTIMATION METHODOLOGY

The advanced demographic techniques for estimating population that were described in the preceding section are virtually never used by the vast majority of municipalities. Besides the Housing Unit Method, a number of techniques often used by municipalities can be subsumed under the rubric of "ratio-based" methods. These techniques are based on observing recorded changes in symptomatic variables that are believed to bear a relationship to population change and for which current measurements are available. These methods usually assume that the ratio of a symptomatic variable to a population enumeration found in a "benchmark" year (usually the most recent decennial census) will remain fixed over time. Consequently, it is assumed that a change in population occurs in the same manner as a change in the symptomatic variable (or variables) over the same period. Typical symptomatic variables found in this approach include births, deaths, employment, voter registrations, school enrollments, residential utility and telephone connections, and tax records.

The general formula for expressing the ratio-based methods is

$$\frac{Pi}{Si} = Ri$$

where

Pi = Population at (benchmark) time i
Si = Symptomatic variable at (benchmark) time i

To determine the postcensal population, the following logic is applied:

$$(S_{i+j})(R_i) = P_{i+j}$$

where

$S_{i+j}$ = Symptomatic variable at time i+j
$R_i$ = Ratio as measured at the date of the most recent benchmark.
$P_{i+j}$ = Estimated population at time i+j

The ratio-based method has no single inherent flaw that precludes it from producing accurate population estimates. However, this approach is susceptible to the following set of problems that can create a large degree of uncertainty concerning the accuracy of its estimates:

1. The symptomatic variable may be formed from data that are not geographically consistent with the area for which an estimate is desired. Variables especially prone to this shortcoming include tax records, employment data, telephone connections, and school enrollments. For example, employment changes reported for a specific municipality may represent, in part, suburban population changes outside the municipality.

2. Symptomatic variables may experience sudden and dramatic departures in their relationships to population. As an example, a sudden increase in telephone connections may be due to an increased availability of private lines rather than an increase in population.

3. Many of the symptomatic variables are measured for the specific geographical area for which a population estimate is desired only at the time of a decennial federal census. Even here the utility of this source is limited because an item may be collected on a sample basis rather than through a complete enumeration. Examples of these variables are school-age population, employment, automobile ownership, and telephone, electrical, and sewer connections.

4. Because of delays in collecting, editing and reporting data, most of the symptomatic variables often lag behind the current year for which a population estimate is desired. Birth, death, employment, voter registration, and tax records are usually published in final form at least a year later than the year to which they are referenced.

5. Often, the ratio-based symptomatic variables vary by municipality. One city may decide that automobile registrations are preferable and another city may use employment data. This variability contributes to a fragmented review process in which consistent criteria can not be uniformly applied to all municipalities.*2/*

Because of these problems, a ratio-based approach to municipal population estimation is particularly troublesome for a state demographic center that is responsible for either generating or reviewing municipal population estimates and producing a set of final, "official" determinations. Unlike the situation with the Housing Unit Method, there is little, if any, ability to either analytically or empirically examine the current relationship between most symptomatic indicators and population. This issue often becomes a point of contention over time, as the benchmark relationship becomes "stale" and disagreements between a state demographic center and a municipality become more likely. In this situation, there may be an ability to resolve a difference in the estimates believed to be accurate by a municipality and a state demographic center by conducting a complete enumeration. However, a census will *only resolve the population difference, it will not correct for the differences in the factors used to generate the estimate unless a special effort is made to obtain the needed information. This is an important point because any census represents a substantial set of costs relative to an estimate and additional question items can significantly increase the total cost of a census.3/*

In its most basic form, a census is simply a "headcount" of residents.*4/* The first step in a headcount census is to identify each place where people live. Then, at each place where people live, questions are asked by an enumerator that determine the residency status of each person there. Thus, in a "headcount" census, living units are systematically canvassed, the occupancy status of each unit is determined, and the number of residents in each unit is found. The costs represented in training, forms, procedures, administration, and tabulation are at a minimum in a headcount census. By adding even one additional question, all of the cost

components are increased substantially. Thus, the work required to obtain the current level of a ratio-based symptomatic variable, say, for example, telephone connections, represents an effort beyond the four integral components of a "headcount" census: housing units, occupancy, average household size, and a group quarters population. In addition, the general utility of obtaining the current level of many symptomatic indicators is extremely limited, which can reduce the willingness of a municipality to obtain their current levels by conducting a census. It could be difficult for a city council to justify a census that would include a count of residential telephones.

## THE CONCEPTUAL AND PRACTICAL STRENGTHS OF THE HOUSING UNIT METHOD

The strongest conceptual feature of the Housing Unit Method is the direct relationship between housing and population. People live in dwellings. There is no other variable that has this level of association with population. The relationship between population and the symptomatic variables used in ratio-based methods, for example, is much more elastic.

Unlike the advanced estimation techniques that were mentioned, the Housing Unit Method can be used by individual municipalities regardless of their size, available resources, and demographic sophistication. A clerk in a small town can apply a simple form of the method or, if the town is very small, conduct a complete census. In a large city, where a complete census would be too costly, a sample household survey could be conducted. In the survey the same procedures found in a complete census are used for a sample of households. This can provide a good empirical basis for estimating current vacancy and household size values at low cost. In addition, the results of a sample can be used to verify analytical estimates of household size values and vacancy rates. Since large cities tend to have good tracking systems for monitoring the change in housing stock, and like small towns, can obtain information on the group quarters population by maintaining lists and contacting managers, the household sample survey can effectively serve many of the same purposes of a complete census. Further the Housing Unit Method is not susceptible to the problems related to ratio-based techniques. In general, the data can be accurately obtained in a timely manner, specifically for the same geographical area for which an estimate is desired; and once these data are obtained, an accurate estimate can be generated at a low level of expense (See, e.g., Lowe, Pittenger, and Walker, 1977). The estimates can then be analysed in a review process that utilizes a common methodology and consistent set of criteria, which are applied uniformly to all municipalities. Further, the general utility of the components of the Housing Unit Method is much greater than those of most symptomatic indicators. Housing, vacancy levels, and average household size are used in many municipal planning and budgetary activities; residential telephone connections, for example, are used much less frequently.

In terms of empirical verification, the strength of the method is that each of its four components (housing units, occupancy, average household size, and group quarters population) is automatically derived from the procedures used for a simple headcount census.5/ Unlike the additional effort required to obtain the value of any of the ratio-based symptomatic variables, the four components of the Housing Unit Method are a logical product of the least-costly form of a census. This logical, cost-effective relationship between the Housing Unit Method and a headcount census program represents a system of annual municipal population determinations that possesses many desirable characteristics. First, through either approach -an estimate or census—the underlying components are the same. From the standpoint of a very small municipality, either the Housing Unit Method or a headcount census can be used by a staff person with limited time and demographic experience. For larger municipalities, the Housing Unit Method represents a cost-effective means of obtaining a current population estimate and provides a complete "audit trail."6/ Consequently, if the initial determination becomes a subject of dispute, each of the four components underlying the estimate can be reviewed and, if necessary, verified with a minimal expenditure.7/ If a census is required (or for a large city, a household sample survey)it can be planned for the succeeding year if time constraints do not permit a census in the current year. From the census, the data and assumptions needed for the the next cycle of population determinations can be revised in accordance with the census results.8/

Probably the most important feature of this system is that a difference in population estimates between a given municipality and its state demographic center can be resolved through a rational procedure, which reduces the possibility of personal or political considerations during the review process. By reducing these considerations, each municipality, regardless of its size and concommitant technical and political resources, is on a relatively equal footing in dealing with the state demographic center. From the standpoint of the state demographic center this is equally desirable because it provides both clearly described and consistently applied criteria for all municipalities and a means of resolving disputed

estimates that effectively precludes a "politicized" review process and, in extreme cases, a legal action. This feature is extremely valuable because of the tendency for an adversary posture to be maintained between a municipality and a state demographic center (See, e.g., Martin and Serow, 1979): the municipality generally perceives that a higher population generates higher revenues while the state demographic center strives to maintain accurate determinations across all municipalities. By using a consistent methodology that can be understood by personnel in all municipalities, suspicion and mistrust can be reduced and the adversary posture softened.

Another important benefit of this system is the development and maintenance of a "cadre" of both state and municipal personnel that is both knowledgeable and effective as a group of applied demographers. The conceptual clarity of the Housing Unit Method and its immediate relationship to the procedures and results of the most simple form of a census provide a strong, cost-effective basis for developing and maintaining this cadre. The existence of such a cadre also enhances the quality of many demographic products both in the private and public sectors. It could also provide a broad support system for a wide range of demographic activities, both applied and academic.

## SUMMARY

The primary focus of the literature dealing with municipal population estimation is on the relative accuracy of different methods. In this paper, some conceptual and practical features of the Housing Unit Method are described from the standpoint of a state-municipal level of activity. These features are derived from the method's cost-effectiveness, simplicity, geographical specificity, and timeliness characteristics that contribute to its potential for consistent accuracy over time. Where a dispute exists over an estimate, strong benefits are also derived from the method's logical, cost-effective relationship with a municipal headcount census program. The Housing Unit Method offers a methodology that can be applied across all municipalities and, consequently, used in a standardized review proce. , that encourages an empirical basis for the resolution of disputed estimates. This system cannot be matched in rationality, cost-effectiveness, and general utility by any other method of municipal population estimation. Finally, the system resulting from the use of the Housing Unit Method in conjunction with a municipal census program offers additional benefits by providing a feasible basis for developing and maintaining an effective group of applied demographers within a state.

## FOOTNOTES

1/ As examples, in Fiscal Year 1982, the State of Alaska distributed 55.7 million dollars to its municipalities through such an allocation formula (State of Alaska, 1982); The State of Washington distributed approximately 79 million dollars to its municipalities in calendar year 1980 using the 1979 population determinations (State of Washington, 1979).

2/ There are exceptions to the use of ratio data for municipal population estimation. One major exception is where municipal population can be aggregated in such a way so that: (1) population and symptomatic data are exactly referenced to each municipality and (2) the aggregated set represents mutually exclusive and exhaustive boundaries. When these conditions can be met, population estimates can be generated using the ratio-correlation regression procedure, a powerful and well-known technique (See, e.g., Swanson, 1980). This procedure, however, is not generally feasible for use by an individual municipality since it requires data for a set of municipalities and a degree of training and experience by the user. It is well suited for use by a State Demographic Center and can be used to generate an alternative set of municipal estimates against which those submitted by individual municipalities can be evaluated and, possibly, adjusted.

3/ The Washington State Demographic Center found that the addition of only a few questions beyond those required for a headcount can increase the total cost of a census by 150% (State of Washington, 1977:64).

4/ In most states, residency for purposes of population determinations is defined generally in accordance with the definition used by the U.S. Bureau of the Census. See, for example, U.S. Bureau of the Census (1980), or State of Alaska (1981A).

5/ For a description of how these components are automatically derived see, for example, State of Alaska (1981A, 1981B).

6/ The concept of an audit trail is useful because population determinations can be viewed as a form of a "budget request" when state funds are distributed to municipalities on the basis of population. By maintaining a standardized procedure that entails uniform reporting of the budget elements (data), consistent evaluation of the data, and recourse to an empirical resolution of disputes, population determinations can be easily placed into terms that a central budget agency can accommodate.

7/ Typically, only two of the four components are involved in a dispute: occupancy and average household size. The most accurate source of housing stock is usually found in municipal records and the population residing in group quarters is usually subject to immediate verification through a list of sites. Further discussion of these issues can be found in Lowe, Pittenger, and Walker (1977).

8/ Census results from one municipality can also be applied to a Housing Unit Method estimate undertaken by another municipality. By developing clusters of "analogue" cities (see, e.g., Lowe, Pittenger, and Walker, 1977), the information found in one city, say, for example, a change in average household size since the last census, can be applied to its "analogue" cities. As a consequence, the general utility of this system is potentially much greater than that offered by systems incorporating other estimation methods.

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# IMPROVING THE MEASUREMENT OF TEMPORAL CHANGE IN REGRESSION MODELS USED FOR COUNTY POPULATION ESTIMATES

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## ABSTRACT

The ratio-correlation method of population estimation is shown to contain an inconsistent temporal relationship between the model's empirical structure and its actual application. A simple transformation of the model's variables is provided that eliminates the inconsistency. Two sets of tests of the relative accuracy of the original and transformed models show that the transformed model achieves accuracy levels equal to or higher than the original. In one set of tests, four out of nine cases for which a higher level of accuracy is found for the transformed model are statistically significant. The transformation, termed the "rate-correlation model," is recommended for consideration as a more logical starting point in the evaluation of temporal stability in regression-based estimates of population.

## INTRODUCTION

The accurate estimation of county populations within a given state is important for many reasons, not the least of which is the role an annual set of estimates plays in allocating general revenue-sharing and other funds to county and sub-county governmental units. These estimates are usually made using the ratio-correlation form of multiple regression (see, e.g., Namboodiri, 1972; O'Hare, 1976; Schmitt and Crosett, 1954; Serow and Martin, 1977; and U.S. Bureau of the Census, 1973); although the difference-correlation form of multiple regression (see, e.g., O'Hare, 1976; Schmitt and Grier, 1966; and Swanson, 1978, 1980, 1981) and other procedures and combinations of procedures may be used (see, e.g., Bogue, 1950; Namboodiri and Lalu, 1971; U.S. Bureau of the Census, 1973; and Zitter and Shryock, 1964). Although the U.S. Bureau of the Census uses the ratio-correlation method in its program of population estimation for federal revenue sharing, more exclusive reliance upon ratio-correlation is found among individual states, many of which use it to generate population estimates for state funded revenue sharing programs.//

This report addresses a logical inconsistency found in both the ratio-correlation and difference-correlation forms and, further, suggests a solution to this inconsistency. For the sake of brevity, the report focuses exclusively on the ratio-correlation form since it is the most commonly used regression method for estimating county populations. However, it is understood that remarks concerning the ratio-correlation form can be generalized, taking into account certain adaptations, to include the difference-correlation and, possibly, other forms of regression used for estimating annual post-censal (or inter-censal) county populations.

In the report that follows a description of the ratio-correlation and its logical inconsistency is first given. Following this description are a proposed transformation of the ratio-correlation form that is designed to eliminate the logical inconsistency, an empirical evaluation of a series of estimates produced by the original and transformed regression forms, and a discussion and summary of the results.

## RATIO-CORRELATION AND ITS LOGICAL INCONSISTENCY

The ratio-correlation method is designed to estimate the temporal change in county population proportions using (observed) temporal changes in county proportions of symptomatic indicators such as automobile registration, employment, registered voters and the like. The temporal change is measured simply by taking a ratio of the proportions at two points in time for each variable; hence the name "ratio-correlation." Since enumerated county population numbers for all counties in a given state are found only in federal decennial census years, models are always constructed using two points in time that are ten years apart. For example, in Washington State, a ratio-correlation model used to estimate county populations annually from 1971 to 1979 was constructed using the ratios of 1970 to 1960 proportions. The ratio-correlation model and its variant, the difference-correlation model, as constructed using two successive decennial census dates, are formally described as:

$$Y = a_0 + a_1x_1 + a_2x_2 + ,\ldots, + a_kx_k + E$$

Where (1) $a_i$ = coefficient to be estimated
$E$ = error term

(2.a) In the ratio-correlation form:

$$Y = \frac{\text{(Population in County, time = } T_{o+10})}{\text{State Total Population}} \div \frac{\text{(Population in County, time = } T_o)}{\text{State Total Population}} = \frac{Y_{o+10}}{Y_o}$$

$$X_i = \frac{\text{Symptomatic (Indicator in County, time = } T_{o+10})}{\text{State Total Indicator}} \div \frac{\text{Symptomatic (Indicator in County, time = } T_o)}{\text{State Total Indicator}} = \frac{X_{io+10}}{X_{io}}$$

(2.b) In the difference-correlation form:

$$Y = Y_{o+10} - Y_o$$

$$X_i = X_{i0+10} - X_{io}$$

Once a model is constructed, the actual estimation is accomplished by algebraically manipulating the model's estimation of change in proportion into actual county population numbers. The estimated county population numbers are then "adjusted" to an independently determined total state population. An example of this procedure for the year 1972 is as follows. First, 1972 over 1970 ratios of symptomatic indicator proportions are substituted into the model that was constructed using ratios of 1970 to 1960 data. These ratios of proportions are the "independent" variables in the model. Next, the model is run and estimated ratios of 1972 to 1970 county population proportions are generated. Since the 1970 county populations are known, these estimates can be algebraically manipulated into estimated 1972 proportions. These estimated proportions are then multiplied by an independently derived state total population for 1972.

The ratio-correlation method offers several advantages over other potential approaches. The most important is probably the use of a measure of proportional change. This characteristic is useful because it controls for differential county population sizes (typical in many states) and yet allows the algebraic manipulation of the model's estimates into an actual population number. This is, indeed, a powerful feature of this technique. A second advantage is that ratio-correlation, being a regression model, possesses characteristics such as R2 and S.E.E. that allow one to make an objective selection of a given model. Many other techniques of population estimation are not based in statistical theory and, consequently, demand a higher level of subjectivity in terms of evaluation and selection. A third advantage is its widespread use. Many state demographic centers and the U.S. Bureau of the Census have used it, often in conjunction with other methods, for many years and consistently have had satisfactory results.

One feature of this method that is inconsistent with its implicit logic is, however, found in its measure of temporal change. The inconsistency is not that a *ratio* is used as a measure of temporal change; it is that temporal change is *inconsistently* measured in moving from model construction to actual use of the model

for population estimation. In the construction of a model, a ratio is taken that refers to a ten year period of change—the ten years between census dates. However, in an actual estimation, the ratios of change in the independent variables always refer to a number of years that is less than the ten year period referenced in model construction. Consider the example given earlier for a 1972 set of estimates. The model coefficients are referenced to a ten year period of change *but* the ratios of 1972 to 1970 proportions for the symptomatic indicators are referenced to a two year period of change. In this case, the model, referenced to a ten year period of change, is now expected to produce an estimate using data that are referenced to a two year period of change. This is a logical inconsistency that exists independently of any considerations regarding the applicability of observed change from 1960 to 1970 to post-1970 events. Why should the model be expected to perform optimally when it is applied to periods that are referenced to less than ten years? This is important because the temporal stability of coefficients has been identified as a critical issue in the accuracy of estimates produced using the ratio-correlation model (see, e.g., O'Hare, 1981; Swanson, 1981; and Mandell and Tayman, 1982). Although the temporal stability of coefficients is a much broader issue than that addressed in this paper, one aspect pertaining to it is certainly the logic of applying a model referenced to a ten year period of change to a period less than ten years. While this situation may not be crippling in actual practice, the issue exists and deserves both a discussion of its potential effects and a remedy.

## RESOLVING RATIO-CORRELATION'S INCONSISTENCY

A solution that comes immediately to mind is to construct a model that is referenced to an annual *rate of change* rather than a decennial *amount* of change. Such a model would be logically consistent with any estimation because an annual rate of change can be applied to find the change expected over any number of years. This solution can be accomplished using one of several approaches to measuring rates of change, linear, geometric, or exponential (see, e.g., Shryock and Siegel, 1973: 377-380). Constructing such a model would require additional transformations of the variables in order to estimate an annual rate of change, but, in return, a model so constructed could be appropriately referenced to each of the post-censal (or inter-censal) years for which an estimate is desired. A measure of an annual rate of change that is a natural extension of the ratio-correlation logic is based on an exponential approach to change. An average annual rate of change is found by taking the natural logarithm of the "ratio" and dividing the result by the total number of years between two successive census dates. Formaly described, the modified ratio-correlation model as constructed using two successive decennial census dates is

$$Y = a_0 + a_1x_1 + a_2x_2 +, \ldots, a_kx_k + E$$

Where:

$$Y = \frac{\ln (Y_{0+10}/Y_0)}{10}$$

$$X = \frac{\ln(X_{i0+10}/X_{i0})}{10}$$

When this model is applied the actual estimated product will be the rate of annual *change in the county population proportions, which can be easily manipulated into the appropriate expected amount of change expected over the period in question.* This amount of change simply brings one back to the same result found in a "ratio-correlation" procedure that can be algebraically manipulated into a current proportion, and given an independently determined total state population, the estimated population in each county.

While this simple transformation resolves the logical inconsistency in using the ratio-correlation method, its utility must also be judged on other issues. The most important issue is the relative gain in accuracy obtained when the ratio-correlation method is extended to become an "average annual rate of change" method, or, as referred to in shorthand form for the remainder of this paper, the "rate-correlation" method. The issue of gains in accuracy is, however, difficult if not impossible, to answer because the non-census years for which this transformation is designed are the very years for which complete census data are not available. Consequently, in this paper, a surrogate for population—school enrollment—is used in one evaluation to examine the relative accuracy of both the ratio-correlation and rate-correlation models. In the final analysis, such an evaluation can not be regarded as complete. However, neither can it be said that such an evaluation is less satisfactory than others that have been conducted using population data as measured only at decennial census dates. On the one hand, the use of enrollment data as the dependent variable allows a look at the estimation accuracy of a model for a set of non-census years that could not be assessed by using population as the dependent variable; on the other hand, population figures

are the desired, ultimate use of these models but the only time for which these data are available is once every ten years.

## EMPIRICAL RESULTS

In this section two distinct evaluations are conducted. The first involves using county enrollments in grades 1 to 8 as the object of estimation, while the second involves actual county populations.

### Enrollment Models

Using Washington state's county enrollment in grades 1-8, estimation models are constructed over 1970 and 1960 using three symptomatic indicators: employment (covered by unemployment insurance); registered voters; and registered private automobiles.2/ The ratio-correlation model and the rate-correlation model constructed using the same 1970-1960 data are presented in Table 1.

TABLE 1

1970-1960 BASED MULTIPLE REGRESSION MODELS FOR ENROLLMENT

| Symptomatic Indicator | Ratio-Correlation Form: Unstandardized Regression Coefficient | Ratio-Correlation Form: Standardized Regression Coefficient | Rate-Correlation Form: Unstandardized Regression Coefficient | Rate-Correlation Form: Standardized Regression Coefficient |
|---|---|---|---|---|
| (Intercept) | -.01469 | --- | -.005781 | --- |
| Employment | .07633 | .13889 | .079758 | .13290 |
| Voters | .22181 | .17617 | .24852 | .18156 |
| Autos | .66428 | .62861 | .64918 | .60234 |
| | $R$ = .8679 | | $R$ = .8440 | |
| | $R^2$ = .7532 | | $R^2$ = .7123 | |
| | Adj. $R^2$ = .7321 | | Adj. $R^2$ = .68767 | |
| | S.E.E. = .0744 | | S.E.E. = .00852 | |

These two models, as would be expected, exhibit similar characteristics but the ratio-correlation model appears to give a better fit than does the rate-correlation model. This is also consistent with expectations since the rate-correlation model attempts to use the *amount* of observed decennial change in order to estimate a *rate* of change.

Using these two models, estimates of enrollment were generated for each year from 1971 to 1979 and their respective levels of accuracy were judged relative to the actual enrollments reported for these years. The index of accuracy used is the mean of the absolute percentage error. Following the work of Mandell and Tayman (1982), paired observation T-tests were used to determine whether significant differences exist between the mean errors of the two models. The results, shown in Table 2, reveal that the rate-correlation model exhibits a lower level of error for each year, and in addition, in four of these years, 1976 through 1979, the difference is statistically significant ( = .05).

TABLE 2

ACCURACY OF 1971 THROUGH 1979 ENROLLMENT ESTIMATES USING THE 1970-1960 BASED REGRESSION MODELS

| Year | Mean Absolute Percentage Difference: Ratio-correlation Model | Mean Absolute Percentage Difference: Rate-correlation Model | One Tailed Probability (df=38) |
|---|---|---|---|
| 1971 | 2.08 | 1.99 | .10<p<.25 |
| 1972 | 3.56 | 3.49 | .10<p<.15 |
| 1973 | 4.41 | 4.39 | .40<p<.45 |
| 1974 | 5.31 | 5.20 | .10<p<.25 |
| 1975 | 5.56 | 5.54 | .40<p<.45 |
| 1976 | 6.04 | 5.78 | .001<p<.005* |
| 1977 | 6.87 | 6.62 | .001<p<.005* |
| 1978 | 6.93 | 6.74 | .01<p<.05* |
| 1979 | 7.16 | 6.92 | .001<p<.005* |

*Statistically Significant.

Both models exhibit a similar pattern in the trend of errors: the degree of accuracy declines as the number of years between 1970 and the estimate year increases. This trend indicates that the *amount of change* and the *rate of change* for enrollments in the 1970's is less and less like the *amount* and *rate* of change exhibited between 1970 and 1960, the two dates over which the models were constructed. This observation is not unexpected given the changes in fertility and migration that have occurred in Washington over the past two decades. However, the results of the statistical tests indicate that the relative gain in accuracy of the rate-correlation model becomes significant as time goes by.

While the rate-correlation method shows a consistently higher degree of accuracy, the relative gain in accuracy is not dramatic. This, in part, is due to the relatively high levels of accuracy already existing for the ratio-correlation method. Consider, for example, 1971 in which the absolute mean percent error for the ratio-correlation method is only 2.08. This is an exceedingly high degree of accuracy and it does not leave much room for improvement. Consequently, while the rate-correlation does improve it, the relative gain for five of the nine years could be considered marginal.

While it appears that the rate-correlation method is consistently more accurate than the ratio-correlation method, this evaluation is not directly transferable to the problem of estimating population. It can, however, be taken as an indication that transforming a ratio-correlation model into a rate-correlation model has the potential to improve estimation accuracy. A conservative approach to this evaluation would be that the rate-correlation method may or may not improve the population estimation accuracy expected from a ratio-correlation model but it is not expected to provide less accurate population estimates. As empirical support for this argument, the following section contains an evaluation of the relative accuracy of the two methods in estimating county population levels at a census date, 1970.

## Population Models

Again using Washington state data, each county's civilian population under sixty-five years of age, is the object of estimation. Here, the census data are for 1970, and the years for which data are taken to construct the models are 1960 and 1950. The three symptomatic indicators used are: employment; registered voters; and enrollment. These symptomatic indicators were selected because they give the optimal ratio-correlation model available when using only three independent variables. The ratio-correlation model and its corresponding rate-correlation model are presented in Table 3.

TABLE 3

1960-1950 BASED MULTIPLE REGRESSION MODELS
FOR CIVILIAN POPULATION UNDER 65 YEARS OF AGE

| | Ratio-Correlation Form | | Rate-Correlation Form | |
|---|---|---|---|---|
| Symptomatic Indicator | Unstandardized Regression Coefficient | Standardized Regression Coefficient | Unstandardized Regression Coefficient | Standardized Regression Coefficient |
| (Intercept) | .046618 | --- | .0021596 | --- |
| Employment | .066786 | .07633 | .049872 | .07171 |
| Voters | .550365 | .51085 | .54197 | .50093 |
| Enrollment | .356083 | .45481 | .34361 | .47023 |
| | $R$ = .97443 | | $R$ = .97128 | |
| | $R^2$ = .94952 | | $R^2$ = .94339 | |
| | Adj. $R^2$ = .94519 | | Adj. $R^2$ = .93853 | |
| | S.E.E. = .05022 | | S.E.E. = .00512 | |

As in the case of the two models for enrollment presented earlier in Table 1, these two models have structural similarities that are consistent with the transformation of a decennial amount of change to a rate of change. The models exhibit very high levels of explained variation or "fit" although, once again, the ratio-correlation model displays a slight advantage. Using these two models, estimates were generated for 1970 in order to compare the estimates produced by each model with the actual enumerated populations. The results of this evaluation are presented in Table 4.

TABLE 4

ACCURACY OF 1970 ESTIMATES OF THE CIVILIAN POPULATION
UNDER 65 YEARS OF AGE
USING THE 1960-1950 BASED REGRESSION MODELS

| Year | Mean of the Absolute Percentage Differences | | One-tailed Probability (df=38) |
|---|---|---|---|
| | Ratio-Correlation | Rate-Correlation | |
| 1970 | 5.068 | 5.062 | .20<p<.25 |

In this comparison, it is obvious that both methods produce similar results. The mean errors are virtually identical and no statistical difference is shown by the paired observation T-test. Given that the pattern of change found during the 1950 to 1960 period is roughly similar in the 1960 to 1970 period, both models *should* produce virtually identical estimates. It is not surprising that they do this. A key point here is that the rate-correlation model did not provide *less* accurate estimates than the ratio-correlation model. The actual population of each county and the percentage differences found under each model are given in Table 5.

TABLE 5

ACTUAL ENUMERATED CIVILIAN POPULATION UNDER SIXTY-FIVE YEARS OF AGE, AND
PERCENTAGE DIFFERENCE BETWEEN ACTUAL AND ESTIMATED
FOR THE TWO MODELS, BY COUNTY, WASHINGTON 1970

| County | Enumerated | Percentage Differnece | |
|---|---|---|---|
| | | Ratio-Correlation | Rate Correlation |
| Adams | 11,102 | 2.570 | 0.673 |
| Asotin | 11,862 | -0.360 | -0.416 |
| Benton | 63,144 | 7.411 | 7.652 |
| Chelan | 35,862 | 1.426 | 1.462 |
| Clallam | 30,023 | 4.489 | 4.662 |
| Clark | 116,663 | -4.587 | -4.647 |
| Columbia | 3,771 | 11.953 | 10.581 |
| Cowlitz | 62,586 | -1.518 | -1.385 |
| Douglas | 15,287 | 7.116 | 6.740 |
| Ferry | 3,336 | 2.152 | 2.724 |
| Franklin | 23,983 | 3.281 | 3.420 |
| Garfield | 2,546 | 8.814 | 8.138 |
| Grant | 38,921 | 9.839 | 10.416 |
| Grays Harbor | 52,583 | -0.779 | -0.359 |
| Island | 20,589 | 7.897 | 7.509 |
| Jefferson | 9,235 | 3.423 | 3.353 |
| King | 1,054,271 | -1.761 | -1.603 |
| Kitsap | 86,529 | -0.625 | -0.553 |
| Kittitas | 22,764 | -12.266 | -12.082 |
| Klickitat | 10,729 | 11.552 | 12.196 |
| Lewis | 39,265 | 2.187 | 2.067 |
| Lincoln | 8,168 | 12.452 | 12.597 |
| Mason | 18,411 | -2.956 | -2.715 |
| Okanogan | 22,952 | 3.068 | 2.995 |
| Pacific | 13,310 | -3.580 | -3.365 |
| Pend Oreille | 5,185 | 14.162 | 14.805 |
| Pierce | 339,048 | 2.177 | 2.246 |
| San Juan | 3,089 | -4.603 | -5.682 |
| Skagit | 45,703 | 6.924 | 7.389 |
| Skamania | 5,330 | 0.554 | 1.020 |
| Snohomish | 245,193 | -5.691 | -7.072 |
| Spokane | 251,057 | 2.320 | 2.759 |
| Stevens | 15,178 | 4.189 | 4.650 |
| Thurston | 68,719 | 1.301 | 1.060 |
| Wahkiakum | 3,137 | 8.677 | 6.853 |
| Walla Walla | 36,608 | 4.686 | 5.202 |
| Whatcom | 72,111 | -1.817 | -1.816 |
| Whitman | 34,843 | -6.696 | -6.555 |
| Yakima | 128,960 | 5.812 | 5.984 |

Examination of the individual cases in Table 5 supports the indications given by the summary statistics presented in Table 4: both models are virtually identical. No discernable trends in error are evident by size of county, urbanization levels, or geographical location.

## DISCUSSION AND SUMMARY

Perhaps one point that emerges from the empirical results requiring special consideration is in the similarity of the ratio-correlation and rate-correlation population estimates for 1970 using the 1960-1950 based models. When data are only available at ten year intervals for evaluating estimates, the actual estimation accuracy of a given model over virtually ninety percent of its use is unknown. For example, while the relative gains in accuracy achieved using the rate-correlation model to estimate annual enrollments are modest, they are, nevertheless, observable gains and, in four of the nine years, statistically significant. Whether the rate-correlation model for *population* would exhibit similar gains in accuracy during inter-censal years is a question that can never be answered empirically. The inter-censal data are not sufficiently complete.

However, the evidence provided by the enrollment data suggests that it may, in fact, be worthwhile to assume that a rate-correlation model may achieve a higher degree of accuracy for population estimates. In any event, the evidence shows that the rate-correlation model is not likely to produce less accurate population results than the ratio-correlation model. One reason for this is that it uses the same trends as the ratio-correlation model. If these trends deteriorate during a number of estimation years, then the ratio-correlation model will suffer as much as, if not more than, its corresponding rate-correlation model. In fact, it is reasonable to assume that the rate-correlation model would be more accurate in this situation because it expresses the trend more conservatively than its corresponding ratio-correlation model. Witness the evidence provided by the tests of enrollment estimates found in Table 2.

Considering the issue of temporal stability, the rate-correlation model may provide a good starting point for further research in this area. If researchers continue to evaluate this issue solely with respect to the ratio-correlation model, its full potential for accuracy may not be realized. The rate-correlation procedure is, after all, only a simple transformation of the ratio-correlation model and, as such, generalizes the model's measurement of temporal change from a decennial amount of change to an annual rate of change. This transformation is argued to be an improvement because it provides a consistent relationship between the temporal measurement found in a model's empirical structure and its actual application.

## Footnotes

1/ As examples, in 1979, official county population estimates for Washington produced with the aid of the Ratio-Correlation Regression Method, form a basis for the allocation of $8 million directly to county governments and $79 million to sub-county governmental units in 1980 (State of Washington, 1979: i), and in 1981, estimates using the same method played a major role in the distribution of $55.7 million dollars to boroughs and municipalities in Alaska (State of Alaska, 1981).

2/ The data used in this and subsequent tables are all contained in the official Washington State Data Base maintained by the Population, Enrollment, and Economic Studies Division, Office of Financial Management, State of Washington.

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# AVAILABILITY OF 1980 CENSUS DATA

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Published data from the 1980 Census became widely available during 1982. The Bureau of the Census published seven volumes out of a series of eleven planned from the 1980 Census. These have been widely disseminated to major libraries throughout the state and affiliate locations of the Alaska Census Data Network. In addition, Summary Tape Files 1, 2, 3 and the EEO File were released. These computer files provide added detail to data published in printed form. Individuals who are interested in ordering copies will find a description of each publication, its report number and the address to which to send orders on Table 1.

Local governments have also highlighted data from the Census. The Municipality of Anchorage has published the first volume (Population and Housing) in a series of six census profiles. The Fairbanks North Star Borough reprinted tables from Summary Tape File One in their "Community Research Quarterly," Winter 1982. Copies can be ordered directly from the municipalities.

Many other reports based upon census data are anticipated from state agencies this year. The Department of Labor will be publishing the "1980 Census Atlas," which will also include characteristic data from the 1970 and 1980 decennial censuses. A quarterly bulletin from the Alaska Census Data Network-AK'CENS-also features articles based upon characteristic data from the census. The Department of Community and Regional Affairs is also publishing selected census data at the "place" level. This report will be similar to the series produced by the department for the 1970 census.

TABLE 1

TIME SCHEDULE AND DESCRIPTION OF SELECTED 1980 CENSUS REPORTS FROM THE U. S. BUREAU OF THE CENSUS

| REPORT NAME | | Population | | | | Housing | | | Geographic Coverage | | | | | | | | Date of Release | Published Form | Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | Title | Population Counts | Population items asked of all: age, race, sex, marital status, etc. | Population items from long form: Nativity, language, veterans, etc. | Long form population items cross-classified with age, race, sex, etc. | Housing Counts | Housing items asked of all: plumbing, rooms ownership, etc. | Housing items from long form: building type, water/source, fuel, etc. | Statewide | 3 Census Areas | 24 Census Sub-areas | Anchorage | Selected Municipalities | Incorporated Places | Unincorporated Places | Villages | A-Available | P-(Paper Copy) M-(Microfiche) C-(Computer Tape) | U-Unknown |
| PHC 80-V | Final Population & Housing Unit Counts | X | | | | X | | | X | X | X | X | X | X | X | X | A | P | U |
| PHC 80-1 | Block Statistics 1/ | X | X | | | | X | | | | | X | X | | | | A | M | U |
| PHC 80-2 | Census Tracts 2/ | X | X | | | | X | | | | | X | X | | | | A | M | U |
| PHC 80-3 | Summary Characteristics for Governmental Units | X | X | X | | X | X | X | X | X | | X | | X | | | A | ? | 4.75 |
| PC 80 1-A | Number of Inhabitants | X | | | | | | | X | X | X | X | X | X | X | X | A | P | 3.00 |
| PC 80 1-B | General Population Characteristics | X | X | | | | | | X | X | X | X | X | X | | X | A | P | 5.50 |
| PHC 80-S2-3 | Advance Estimates of Social Economic and Housing Characteristics | X | | X | X | X | | X | X | X | | X | | | | | A | P | U |
| PC 80-1-C | General Social & Economic Statistics | X | | X | | | | | X | X | X | X | X | X | | X | 1983 | P | U |
| PC 80-1-D | Detailed Population Characteristics | X | | X | X | | | | X | | | X | | | | | 1983 | M | U |
| PC 80-2 | Volume II Subject Report | X | X | X | X | | | | X | | | X | X | | | X | 1983 | P | U |
| HC 80-1-A | General Housing Characteristics | | | | | X | X | | X | X | | X | X | X | | X | A | P | 5.50 |
| HC 80-1-B | Detailed Housing Characteristics | | | | | X | | X | X | X | | X | X | | | X | 1983 | P | U. |

TABLE 1
(continued)

TIME SCHEDULE AND DESCRIPTION OF SELECTED 1980 CENSUS REPORTS FROM THE U. S. BUREAU OF THE CENSUS

| REPORT NAME | | Population | | | | Housing | | | Geographic Coverage | | | | | | | | Date of Release | Published Form | Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | Title | Population Counts | Population items asked on all age, race, sex, marital status, etc. | Population items from long form: Ancestry, language, veteran, etc. | Long form population items cross-classified with age, race, sex, etc. | Housing Counts | Housing items asked of all: plumbing, rooms ownership, etc. | Housing items from long form: building type, water/sewage, fuel, etc. | Statewide | 23 Census Areas | 24 Census Sub-areas | Anchorage | Selected Municipalities | Incorporated Places | Unincorporated Places | Villages | A-Available | P-(Paper Copy) M-(Microfiche) C-(Computer Tape) | U-Unknown |
| Summary Tape File 1 | | X | X | | | X | X | | X | X | X | X | X | X | X | X | A | C,M | U |
| Summary Tape File 2 | | X | X | | | X | X | | X | X | X | | | X | | X | A | C | U |
| Summary Tape File 3 | | X | X | X | X | X | X | X | X | X | X | X | | X | X | X | A | C, M | U |
| Summary Tape File 4 | | X | | X | X | X | X | X | X | X | | X | X | | | X | 1983 | C | U |
| Public Use Micro-data Sample | | | | X | X | | X | X | X | | | X | | | | | 1983 | C | U |
| Equal Employment Opportunity (Affirmative Action) File | | | | | X | | | | X | X | | X | | | | | A | C, M | U |
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1/ Block Statistics for Anchorage, Fairbanks (and North Pole), Cordova, Juneau.
2/ Tract statistics for Anchorage, Fairbanks.

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